United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with Tennessee Agricultural Experiment Station, the Cheatham County Board of Commissioners, and the Tennessee Department of Agriculture

Soil Survey of Cheatham County, Tennessee

Detailed maps are available in two formats. Digital copies (SSURGO) that can be used in a Geographic Information System (GIS) can be accessed at http://www.ftw.nrcs.usda.gov/ssur_data.html. (The State Soil Survey Area ID is TN021.) Paper copies of the maps can be obtained from the Natural Resources Conservation Service, District Conservationist, 1102 North Main Street, Ashland City, TN 37015 (telephone number 615-792-5161, ext. 3).

How to Use This Soil Survey

General Soil Map

The general soil map, which is a color map, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

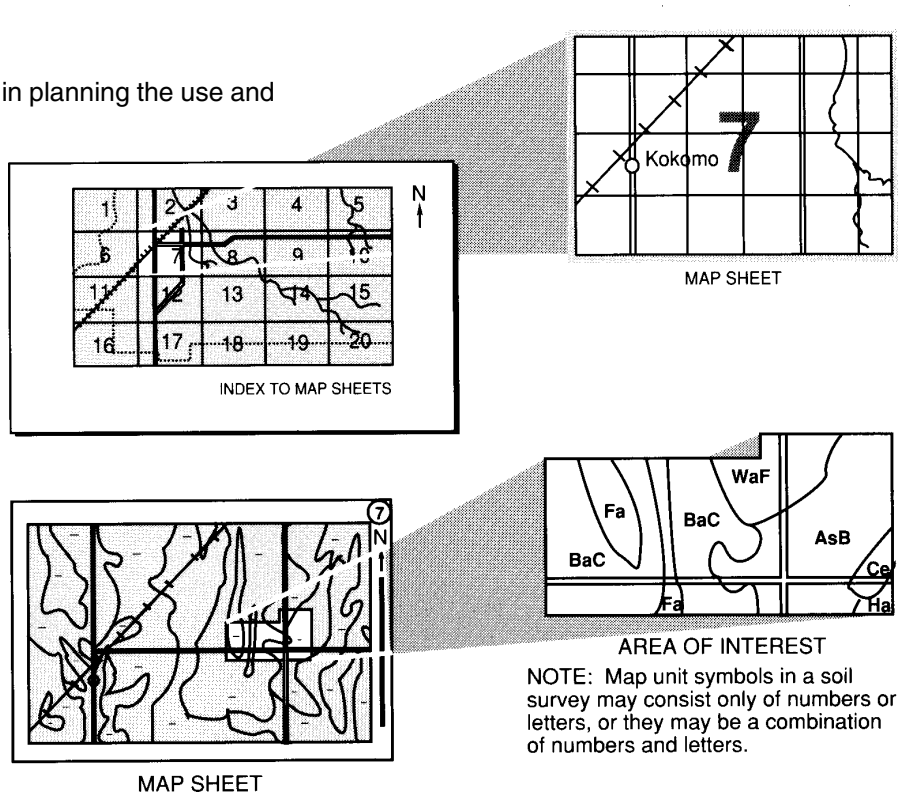
Detailed Soil Maps

The detailed soil maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**. Note the number of the map sheet and turn to that sheet.

Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Contents**, which lists the map units by symbol and name and shows the page where each map unit is described.

The **Contents** shows which table has data on a specific land use for each detailed soil map unit. Also see the **Contents** for sections of this publication that may address your specific needs.



NOTE: Map unit symbols in a soil survey may consist only of numbers or letters, or they may be a combination of numbers and letters.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1990. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1990. This survey was made cooperatively by the Natural Resources Conservation Service, the Tennessee Agricultural Experiment Station, the Cheatham County Board of Commissioners, and the Tennessee Department of Agriculture. The survey is part of the technical assistance furnished to the Cheatham County Soil Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Typical scene along the Cumberland River in Cheatham County. Rock bluffs are common along the river. Beason and Wolftever soils are on the stream terraces below the bluffs.

Additional information about the Nation's natural resources is available on the Natural Resources Conservation Service home page on the World Wide Web. The address is http://www.nrcs.usda.gov (click on "Technical Resources").

Contents

Issued 2000

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations that affect various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

James W. Ford
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Cheatham County, Tennessee

By Johnson C. Jenkins, Natural Resources Conservation Service

Soils surveyed by Johnson C. Jenkins, James R. Smith, Jr., Terry E. Henry,
J. Craig Harris, and David W. Thomas

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
the Tennessee Agricultural Experiment Station, the Cheatham County
Board of Commissioners, and the Tennessee Department of Agriculture

CHEATHAM COUNTY is in north-central Tennessee (fig. 1). It is bounded on the north by Montgomery and Robertson Counties, on the east by Robertson and Davidson Counties, on the south by Williamson County, and on the west by Dickson and Montgomery Counties. According to a special census, the population of the county was 25,412 in 1987. Ashland City, which is the county seat, is in the geographical center of the county. The county makes up 196,400 acres, or about 307 square miles.

The county has a diverse economy. The three major economic enterprises in the county are farming, industry, and real estate. Dark-fired tobacco is the main cash crop. Other important crops are corn, wheat, soybeans, and grain sorghum. Industry contributes significantly to the county's economic welfare, and a large segment of the population in the county is employed by the industries. In recent years the sale and development of real estate have increased dramatically in the county.

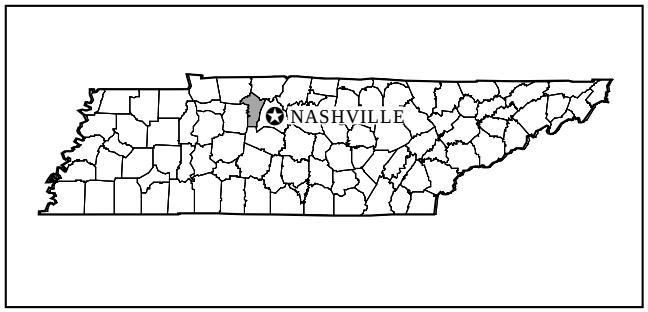


Figure 1.—Location of Cheatham County in Tennessee.

General Nature of the County

This section gives general information about Cheatham County. It describes the history and development, industry and transportation facilities, physiography and drainage, and climate.

History and Development

Cheatham County was established by an act of the General Assembly of the Tennessee Legislature on February 28, 1856. The act provided that a new county should be established and composed from parts of Davidson, Robertson, Montgomery, and Dickson Counties. The county was named in honor of Edward Saunders Cheatham, speaker of the Tennessee State Senate.

The first settlement in Cheatham County dates back to about 1780, when Adam Binkley and his family settled along Sycamore Creek, about 4 miles north of where Ashland City is today (Bond 1986; Goodspeed 1972).

Industry and Transportation Facilities

Industries within the county include enterprises engaged in manufacturing, agriculture, construction, transportation, communications, wholesale and retail trades, and public services. The county is the home of the largest manufacturing plant of water heaters in the world.

The county has a very efficient system of 11 State and Federal highways, including 2 interstate highways. Because of the excellent network of county, State, and Federal highways, every part of the county is accessible for the easy movement of farm products and freight. The Cumberland River, which flows through the county, is an important waterway for river commerce. Nashville is the nearest port facility. The county is served by two railroad systems. Nashville International Airport is the closest commercial airport (Ashland City Times 1988).

Physiography and Drainage

Cheatham County is in the Western Highland Rim physiographic area of Tennessee. The geologic material in which the soils formed are Mississippian siltstone and limestone, Pleistocene loess, and recent alluvium.

The topography in the northern part of the county generally is characterized by gently sloping ridges adjoining moderately steep or steep side slopes along drainageways. The soils in these areas are well drained or moderately well drained. Several areas in the northern part of the county are characterized by nearly level flats that collect runoff from the adjacent ridges. These nearly level soils do not have a distinct drainage pattern and are not so well drained. Also significant in this part of the county are areas of karst landforms that are characterized by a series of sinkholes and that have no apparent surface drainage. The sinkholes are interconnected to subterranean passages and caverns that eventually emerge in the Cumberland River.

The topography in the central and southern parts of the county is characterized by narrow sloping ridges adjacent to steep or very steep side slopes. The soils in these areas are highly dissected by narrow drainageways. They are well drained or somewhat excessively drained.

Traversing the center of the county are long, narrow flood plains and stream terraces adjacent to the Cumberland and Harpeth Rivers. The soils in these areas are well drained to poorly drained.

Cheatham County is drained by two major river systems—the Cumberland and Harpeth Rivers. The Cumberland River flows from the southeast to the northwest across the center of the county. Flow is normally moderate to sluggish, except in winter and early spring when it can be moderately rapid. The mean water depth is controlled by the Cheatham Dam, which is a Corps of Engineers water-control facility located in the westernmost reach of the river in Cheatham County. The Harpeth River flows from south to north across the southern part of the county. Flow is moderately rapid most of the year, except in dry summer months when it becomes moderate. The flood plains on both of the river systems are long and narrow with adjacent stream terraces along most of their lengths. The flood plains of the rivers and their major tributaries are subject to occasional flooding during periods of heavy rainfall. Many areas along both rivers have nearly vertical rock bluffs adjacent to the stream channel.

Climate

Table 1 gives data on temperature and precipitation for the survey area as recorded at Cheatham Lock in the period 1971 to 1987. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter, the average temperature is 38 degrees F and the average daily minimum temperature is 27 degrees. The lowest temperature on record, which occurred on January 17, 1982, is -18 degrees. In summer, the average temperature is 76 degrees and the average daily maximum temperature is 88 degrees. The highest recorded temperature, which occurred on July 17, 1980, is 107 degrees.

Growing degree days are shown in table 1. They are equivalent to “heat units.” During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is about 51 inches. Of this, 49 percent usually falls in April through September. The growing season for most crops falls within this period. In 2 years out of 10, the rainfall in April through September is less than 13 inches. The heaviest 1-day rainfall during the period of record was 4.8 inches on December 8, 1978. Thunderstorms occur on about 54 days each year.

The average seasonal snowfall is about 6 inches. The greatest snow depth at any one time during the period of record was 8 inches. On the average, 7 days of the year have at least 1 inch of snow on the ground.

The average relative humidity in midafternoon is about 55 percent. Humidity is higher at night, and the average at dawn is about 85 percent. The sun shines 65 percent of the time possible in summer and 45 percent in winter. The prevailing wind is from the south. Average windspeed is highest, 10 miles per hour, in spring.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area. The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

The descriptions, names, and delineations of the soils in this survey area do not fully agree with those of the soils in adjacent survey areas. Differences are the result of a better knowledge of soils, modifications in series concepts, or variations in the intensity of mapping or in the extent of the soils in the survey areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, it consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The components of one map unit can occur in another but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soil Descriptions

1. Sengtown-Mountview-Dickson

Undulating to very steep, well drained and moderately well drained soils that formed in loess and limestone residuum; on uplands

The soils in this map unit dominate most of the northern half of the county. The landscape is characterized by broad, undulating plains; moderately steep to very steep hillsides; and narrow valleys (fig. 2). Throughout this unit are small karst areas in which sinkholes and underground drains are common. The soils in this unit are underlain by limestone. A few perennial streams and many intermittent streams dissect the uplands.

This map unit makes up about 33 percent of the county. It is about percent 67 Sengtown soils, 20 percent Mountview soils, and 9 percent Dickson soils. Guthrie, Taft, Lindside, Nolin, Etowah, Minvale, and Ennis soils are of minor extent in the unit. Guthrie and Taft soils are in slight depressions on uplands. Lindside, Nolin, and Ennis soils are on flood plains. Nolin and Lindside soils are also at the bottom of large sinkholes. Minvale and Etowah soils are on foot slopes.

Sengtown soils are well drained and have a gravelly clay subsoil. They are on narrow, rolling hilltops; in karst areas; and on steep and very steep hillsides. Slopes range from 2 to 60 percent.

Mountview soils are well drained and have about 20 to 24 inches of silty material over a gravelly clay subsoil. They are on undulating and rolling ridgetops above the Sengtown soils. Slopes range from 2 to 12 percent.

Dickson soils are moderately well drained and have a compact, slowly permeable fragipan in the subsoil. They are on broad, undulating ridges. Slopes range from 2 to 5 percent.

The smoother ridgetops are suited to row crops if erosion is controlled. Conservation tillage systems, such as no-till planting, and contour stripcropping reduce the hazard of erosion and help to maintain productivity.

The gentler side slopes are well suited to pasture and hay. Forage crops, such as tall fescue and white clover, grow well and produce good yields.

This unit is well suited to trees. Most of the climatically adapted hardwoods grow well. The slope, a risk of compaction and the formation of ruts, and plant competition are some of the limitations affecting woodland use and management.

Mountview and Sengtown soils are moderately suited to building site development. Restricted permeability and a shrink-swell potential are the main limitations. The slope is also a limitation in the steeper areas of the Sengtown soils. Dickson soils are poorly suited to building site development unless a central sewer system is available. The wetness and the slow permeability are severe limitations on homesites. Low strength is a severe limitation on sites for local roads and streets.

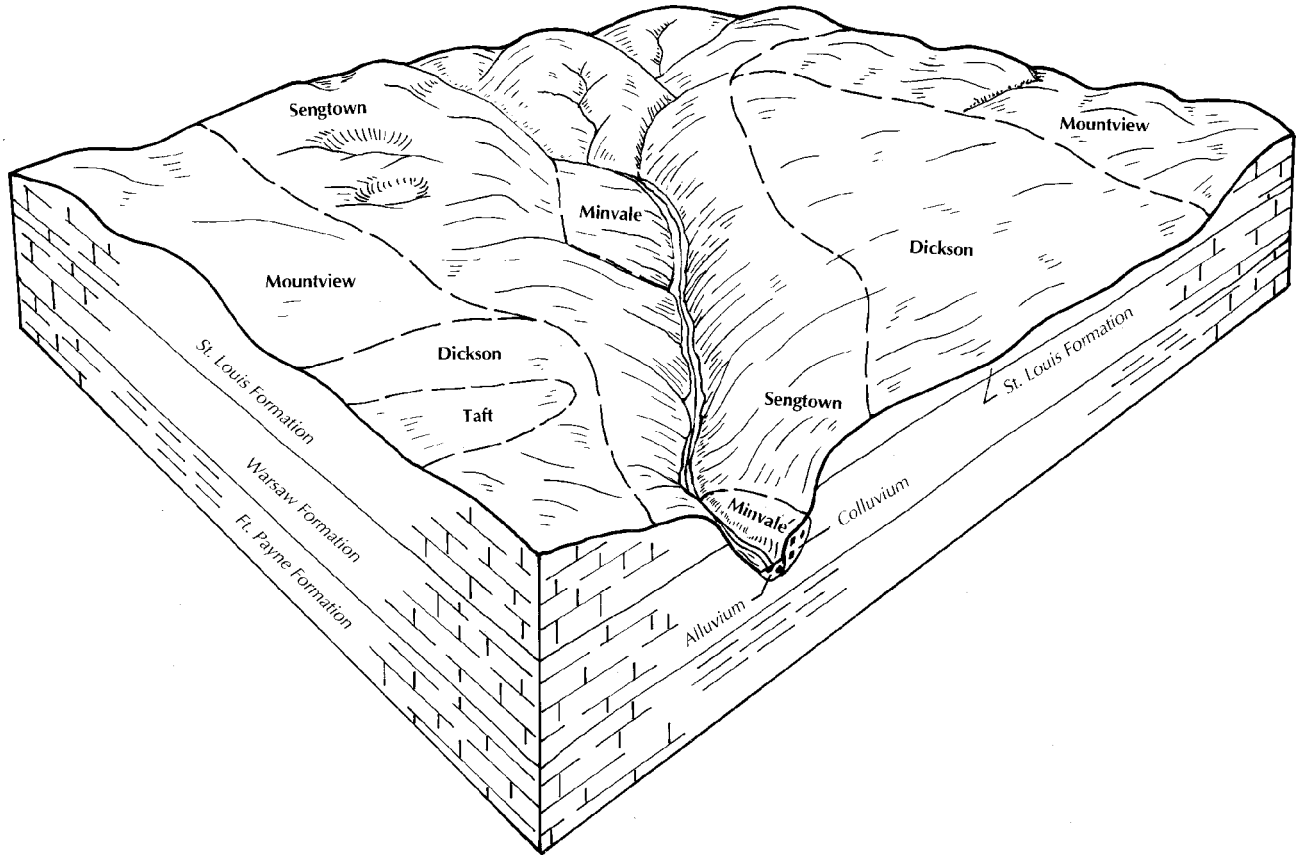


Figure 2.—Relationship of soils to topography and the underlying material in the Sengtown-Mountview-Dickson general soil map unit.

2. Hawthorne-Sulphura-Sengtown

Rolling to very steep, somewhat excessively drained and well drained soils that formed in residuum of siltstone, limestone, and shale; on dissected uplands

The soils in this map unit are in the central and southern parts of the county. The landscape is characterized by narrow, rolling ridgetops; steep and very steep hillsides; and narrow valleys (fig. 3). Rock bluffs are common along the major streams. The soils in this unit are underlain by siltstone or limestone. A few perennial streams are along the larger valleys, and many intermittent streams dissect the uplands.

This map unit makes up about 55 percent of the county. It is about 80 percent Hawthorne and Sulphura soils and 10 percent Sengtown soils. Mountview, Minvale, Nolin, Tarklin, Ennis, Dickson, and Lindside soils are of minor extent in the unit. Mountview and Dickson soils are on ridgetops. Minvale soils are on foot slopes. Tarklin soils are on stream terraces. Nolin, Ennis, and Lindside soils are on flood plains.

Hawthorne soils are somewhat excessively drained. The have a very gravelly subsoil and are moderately deep to soft bedrock. They are on the narrow, rolling hilltops and on the upper and middle parts of the steep and very steep hillsides. Slopes range from 5 to 60 percent.

Sulphura soils are somewhat excessively drained. They have a very gravelly subsoil and are moderately deep to hard bedrock. They are on the lower part of steep and very steep hillsides below the Hawthorne soils. Slopes range from 20 to 60 percent.

Sengtown soils are well drained and have a gravelly clay subsoil. They are on the narrow, rolling hilltops above the Hawthorne soils. Slopes range from 5 to 12 percent.

Sengtown soils are moderately suited to row crops. The small, irregularly shaped areas are difficult to manage because they are intermingled with steeper

slopes. Conservation tillage systems, including no-till planting, and contour stripcropping reduce the hazard of erosion and help to maintain productivity.

Some of the cleared areas of the Sengtown soils are in pasture and hay. Forage crops, such as tall fescue and white clover, grow well and produce good yields.

This unit is moderately suited to trees. Most of the climatically adapted hardwoods grow well on the Sengtown soils. Hawthorne and Sulphura soils tend to be droughty. Drought-tolerant species should be selected for planting. Site and aspect are also important in order to maintain a productive stand of timber.

In most areas this unit is poorly suited to building site development. Sengtown soils are moderately suited in the less sloping areas. Hawthorne and Sulphura soils are poorly suited because of the slope and the depth to bedrock.

3. Beason-Wolftever-Melvin-Arrington

Nearly level to sloping, poorly drained to well drained soils that formed in alluvium; on low terraces and flood plains of the Cumberland River

The soils in this map unit are on nearly level flood plains and on undulating and rolling stream terraces of the Cumberland River (fig. 3). They formed in fine and medium textured alluvium deposited by the Cumberland River.

This map unit makes up about 5 percent of the county. It is about 27 percent Beason soils, 17 percent Wolftever soils, 17 percent Melvin soils, and 9 percent Arrington soils. Newark, Byler, and Tarklin soils are of minor extent in the unit. Newark soils are on flood plains. Byler and Tarklin soils are on stream terraces.

Beason soils are somewhat poorly drained and have a clayey subsoil. They are on nearly level stream terraces. Slopes range from 0 to 3 percent.

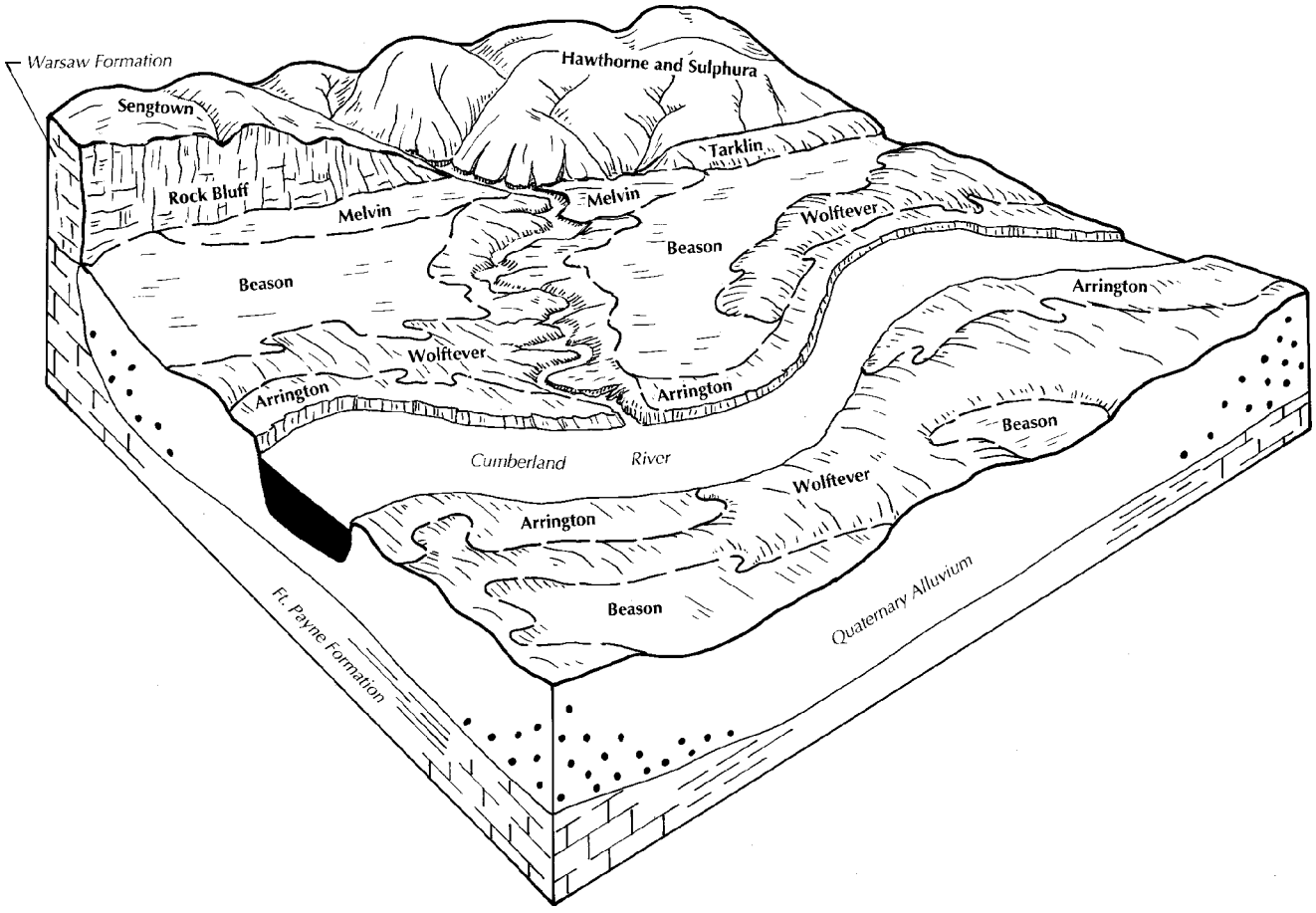


Figure 3.—Relationship of soils to topography and the underlying material in the Beason-Wolftever-Melvin-Arrington and Hawthorne-Sulphura-Sengtown general soil map units.

Wolftever soils are moderately well drained and have a clayey subsoil. They are on nearly level to sloping stream terraces. Slopes range from 0 to 12 percent.

Melvin soils are poorly drained and have a loamy subsoil. They are on flood plains directly below very steep upland side slopes and vertical rock bluffs. Slopes range from 0 to 2 percent.

Arrington soils are well drained and have a loamy subsoil. They are on flood plains along the Cumberland River and at the mouth of some its major tributaries. Slopes range from 0 to 8 percent.

Arrington, Wolftever, and Beason soils are best suited to late-season row crops, such as soybeans and grain sorghum, because they are flooded in late winter and early spring in some years. Melvin soils are poorly suited to row crops because they are frequently flooded.

In most areas this unit is well suited to pasture and hay. Forage crops, such as tall fescue and white clover, grow well because they can withstand the wetness.

This unit is well suited to trees. Most of the climatically adapted bottom-land hardwoods grow well. A risk of compaction and the formation of ruts, the flooding, and the wetness are some of the limitations affecting woodland use and management. Woodland operations should be restricted to summer and fall.

This unit is poorly suited to building site development because of the flooding, the wetness, and the moderately slow permeability.

4. Byler-Nolin-Armour-Arrington

Nearly level to rolling, moderately well drained and well drained soils that formed in alluvium; on stream terraces and flood plains

The soils in this map unit are dominantly along the Harpeth River and its major tributaries. The landscape is characterized by undulating and rolling stream terraces and narrow flood plains (fig. 4). Many stream terraces are characterized by a sequence of narrow terracettes. The soils formed in alluvium deposited by

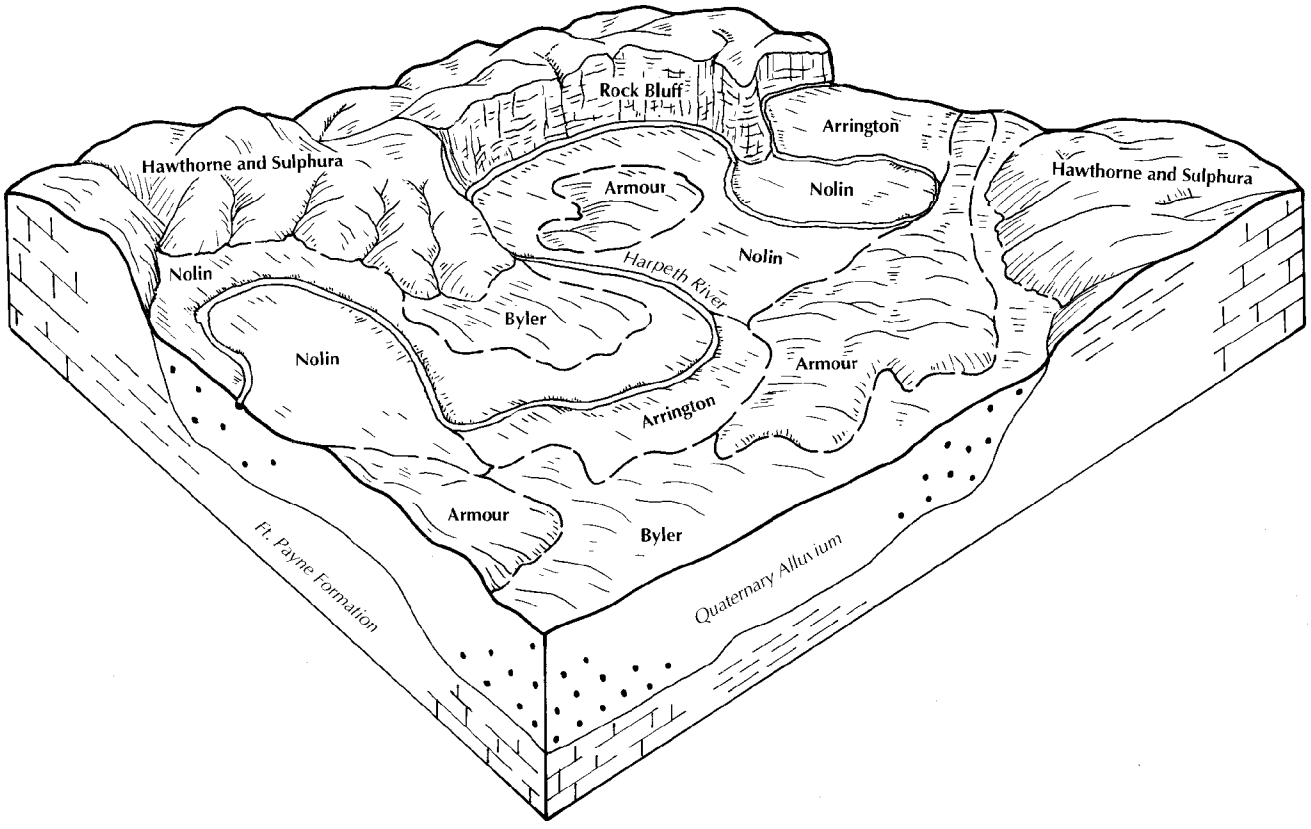


Figure 4.—Relationship of soils to topography and the underlying material in the Byler-Nolin-Armour-Arrington general soil map unit. The Hawthorne and Sulphura soils are adjacent to the map unit.

streams or washed from adjacent uplands. They are underlain by siltstone and limestone.

This map unit makes up about 7 percent of the county. It is about 29 percent Byler soils, 19 percent Nolin soils, 17 percent Armour soils, and 9 percent Arrington soils. Tarklin, Ennis, Lindside, Minvale, and Newark soils are of minor extent in the unit. Tarklin soils are on stream terraces. Minvale soils are on foot slopes. Ennis, Lindside, and Newark soils are on flood plains.

Byler soils are moderately well drained and have a compact, slowly permeable fragipan in the subsoil. They are on benches and side slopes of stream terraces. Slopes range from 2 to 12 percent.

Nolin soils are well drained and have a loamy subsoil. They are on flood plains along the Harpeth River and its major tributaries. Slopes range from 0 to 2 percent.

Armour soils are well drained and are on nearly level to rolling stream terraces. They are slightly higher on the terraces than the Byler soils. Slopes range from 2 to 12 percent.

Arrington soils are well drained and have a loamy subsoil. They are on flood plains. Slopes range from 0 to 8 percent.

Nolin and Arrington soils are well suited to row crops; however, in some years they are flooded in late winter and early spring. Armour and Byler soils are well suited to most of the climatically adapted crops if erosion is controlled. Conservation tillage systems, such as no-till planting, and stripcropping reduce the hazard of erosion in sloping areas and help to maintain productivity.

In most areas this unit is well suited to pasture and hay. Forage crops, such as tall fescue and white clover, grow well and produce good yields.

This unit is well suited to trees. Most of the climatically adapted hardwoods grow well. A risk of compaction and the formation of ruts, the occasional flooding, and the wetness are some of the limitations affecting woodland use and management.

Armour soils are moderately suited to building site development on the gentler slopes. Byler soils are poorly suited because of the wetness and the slow permeability in the fragipan. Nolin and Arrington soils are poorly suited because of the flooding.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information about each map unit is given under the heading "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Mountview silt loam, 2 to 5 percent slopes, eroded, is a phase of the Mountview series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes or associations.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Sengtown-Rock outcrop complex, 20 to 60 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Hawthorne-Sulphura association, steep, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop, very steep, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Soil Descriptions

AmA—Armour silt loam, 0 to 2 percent slopes

This soil is very deep, nearly level, and well drained. It is on stream terraces along the Cumberland and Harpeth Rivers. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 7 inches; brown silt loam

Subsoil:
7 to 14 inches; brown silty clay loam
14 to 60 inches; strong brown silty clay loam

Included with this soil in mapping are a few small areas of the moderately well drained Byler soils on gently sloping terrace ridges. Also included are small, narrow strips of the Arrington soils along drainage channels.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly tobacco, corn, small grain, and soybeans. In a few areas it is used for pasture or hay.

This soil is well suited to row crops. All of the climatically adapted crops grown in the county are suited. The hazard of erosion is slight if the soil is cultivated. The soil is highly productive, and high yields can be attained if the soil is managed properly. Lime and fertilizer, which should be applied according to the results of soil tests, are needed for sustained yields.

This soil is well suited to pasture and hay. Most forage crops, including alfalfa, grow well and produce high yields in areas where the soil has been adequately limed and fertilized and has been properly managed.

This soil is well suited to trees, including yellow poplar, black walnut, white oak, southern red oak, hickory, eastern white pine, and loblolly pine. The main concern in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is well suited to most urban uses. The restricted permeability is a moderate limitation on sites for septic tank absorption fields. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The high content of clay in the subsoil is a moderate limitation on sites for sanitary landfills.

The capability class is I.

AmB2—Armour silt loam, 2 to 5 percent slopes, eroded

This soil is very deep, gently sloping, and well drained. It is on stream terraces along the Cumberland and Harpeth Rivers. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 4 inches; dark yellowish brown silt loam

Subsoil:
4 to 12 inches; yellowish brown silt loam
12 to 45 inches; strong brown silty clay loam
45 to 60 inches; strong brown silty clay loam that has brownish yellow and yellowish red mottles

Included with this soil in mapping are small areas of the moderately well drained Byler soils in slightly lower sinkholes and swales on stream terraces. Also included are small areas of the moderately well drained Tarklin and the well drained Humphreys soils on short side slopes adjacent to flood plains and drainage channels and narrow strips of the somewhat poorly drained Newark soils in slight depressions and in old drainage channels.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In about half of the acreage, this soil is used for crops, mainly tobacco, corn, small grain, and soybeans. The remainder of the acreage is in pasture or hay.

If managed properly, this soil is highly productive and is well suited to all of the climatically adapted row crops grown in the county. A suitable conservation tillage system is needed to prevent further erosion. No-till planting, contour farming, and stripcropping can help to prevent excessive erosion and maintain productivity.

This soil is well suited to hay and pasture. Most forage crops, including alfalfa, grow well and produce good yields in areas where the soil has been adequately limed and fertilized and has been properly managed. No significant limitations affect forage production if erosion is controlled.

This soil is well suited to trees, including yellow poplar, black walnut, white oak, southern red oak, hickory, eastern white pine, and loblolly pine. The main concern in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is well suited to most urban uses. The restricted permeability is a moderate limitation on sites for septic tank absorption fields. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The high content of clay in the subsoil is a moderate limitation on sites for sanitary landfills.

The capability subclass is IIe.

AmC2—Armour silt loam, 5 to 12 percent slopes, eroded

This soil is very deep, sloping, and well drained. It is on stream terraces along the Cumberland and Harpeth Rivers. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 4 inches; dark yellowish brown silt loam

Subsoil:
4 to 12 inches; yellowish brown silt loam
12 to 45 inches; strong brown silty clay loam
45 to 60 inches; strong brown silty clay loam that has brownish yellow and yellowish red mottles

Included with this soil in mapping are small areas of the moderately well drained Byler soils in slightly lower sinkholes and swales on stream terraces and small, intermingled areas of the moderately well drained Tarklin and the well drained Humphreys soils on short side slopes. Also included are narrow strips of the somewhat poorly drained Newark soils in slight depressions and old drainage channels and a few small, narrow strips of the somewhat excessively drained Hawthorne soils on stream terraces adjacent to steep upland side slopes.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or medium acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In about half of the acreage, this soil is used for crops, mainly tobacco, corn, small grain, and soybeans. The remainder of the acreage is in pasture or hay.

This soil is moderately suited to row crops. The hazard of erosion and the slope are the major management concerns. Crops respond well to applications of fertilizer and lime, and moderately high yields can be attained. A well established conservation tillage system, such as no-till planting, or contour stripcropping helps to control excessive erosion and runoff. Adding organic matter, such as manure, growing green manure crops, and returning crop

residue to the soil help to conserve moisture and maintain good tilth.

This soil is well suited to hay and pasture. Most forage crops, including alfalfa, grow well and produce good yields in areas where the soil has been adequately limed and fertilized and has been properly managed. No significant limitations affect forage production if erosion is controlled.

This soil is well suited to trees, including yellow poplar, black walnut, white oak, southern red oak, hickory, eastern white pine, and loblolly pine. The main concern in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability and the slope are moderate limitations on sites for septic tank absorption fields. The slope is a moderate limitation on sites for dwellings and a severe limitation on sites for small commercial buildings. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The slope and the high content of clay in the subsoil are moderate limitations on sites for sanitary landfills.

The capability subclass is IIIe.

ArA—Arrington silt loam, 0 to 2 percent slopes, occasionally flooded

This soil is very deep, nearly level, and well drained. It is on flood plains along the Cumberland and Harpeth Rivers. Slopes range from 0 to 2 percent. Individual areas are about 5 to 60 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 16 inches; dark brown silt loam

Subsoil:
16 to 52 inches; dark brown silty clay loam that has light yellowish brown mottles
52 to 60 inches; brown silty clay loam

Included with this soil in mapping are areas of a soil that is similar to the Arrington soil but has loamy textures. This similar soil is on natural levees on the Cumberland River. Also included are small areas of the moderately well drained Wolftever and somewhat poorly drained Beason soils on low stream terraces and several areas of Arrington soils that have 12 to 19 inches of recent alluvium on the surface. The included Arrington soils are along the major tributaries.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Slightly acid to mildly alkaline
Flooding: Occasional, very brief, usually in late winter and early spring
Seasonal high water table: At a depth of 4 to 6 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly corn, wheat, and soybeans. In some areas it is used for hay or truck crops.

This soil is well suited to row crops. Most of the climatically adapted crops grown in the county are suited, and high yields can be attained. The flooding is the main management concern. Fertilizer, which should be applied according to the results of soil tests, is needed for sustained yields.

This soil is well suited to hay and pasture. Most forage plants are suited. Such plants as tall fescue and white clover are best suited because they can tolerate the short periods of flooding. Alfalfa can be damaged by the flooding during late winter and early spring.

This soil is well suited to trees, including yellow poplar, black walnut, cherrybark oak, American sycamore, sweetgum, and ash. The main concern in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is not suited to most urban uses. The flooding is a severe limitation on sites for septic tank absorption fields, dwellings, small commercial buildings, local roads and streets, and sanitary landfills.

The capability subclass is IIw.

ArB—Arrington silt loam, 2 to 8 percent slopes, occasionally flooded

This soil is very deep, sloping, and well drained. It is on flood plains along the Cumberland and Harpeth Rivers. Most areas of this unit are where floodwaters have developed scours and swales on nearly level flood plains. Slopes range from 2 to 8 percent. Individual areas are about 5 to 40 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 16 inches; dark brown silt loam

Subsoil:
16 to 52 inches; dark brown silty clay loam that has light yellowish brown mottles
52 to 60 inches; brown silty clay loam

Included with this soil in mapping are areas of a soil that is similar to the Arrington soil but has loamy textures. This similar soil is on natural levees on the Cumberland River. Also included are small areas of the moderately well drained Wolftever and somewhat poorly drained Beason soils on low stream terraces and several areas of Arrington soils that have 12 to 19 inches of recent alluvium on the surface. The included Arrington soils are along the major tributaries.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Slightly acid to mildly alkaline
Flooding: Occasional, very brief, usually in late winter and early spring
Seasonal high water table: At a depth of 4 to 6 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for hay or pasture. In a few small areas, it is used for crops, mainly soybeans and grain sorghum, or as woodland.

This soil is moderately suited to row crops. The main limitations are the flooding, the hazard of erosion, and the size and shape of the individual areas of the map unit. The soil generally is in long, narrow strips adjacent to river and stream channels. The size, shape, and variable slope of the unit make managing the soil difficult. In areas that are large enough to be planted to row crops, short-season annuals can be grown if the soil is managed properly to prevent erosion. A conservation tillage system, such as no-till planting, or contour stripcropping helps to control excessive erosion and runoff. Adding organic matter, such as manure, growing green manure crops, and returning crop residue to the soil help to conserve moisture and maintain good tilth.

This soil is well suited to hay and pasture. Most forage plants are suited. Such plants as tall fescue and white clover are best suited because they can tolerate the short periods of flooding. Alfalfa can be damaged by the flooding during late winter and early spring.

This soil is well suited to trees, including yellow poplar, black walnut, cherrybark oak, American sycamore, sweetgum, and ash. The main concern in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is not suited to most urban uses. The flooding is a severe limitation on sites for septic tank absorption fields, dwellings, small commercial buildings, local roads and streets, and sanitary landfills.

The capability subclass is IIe.

Be—Beason silty clay loam, occasionally flooded

This soil is very deep, nearly level, and somewhat poorly drained. It is on low stream terraces along the Cumberland River. Slopes range from 0 to 3 percent. Individual areas are about 5 to 250 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches; brown silty clay loam

Subsoil:
6 to 13 inches; yellowish brown silty clay loam that has brown and strong brown mottles
13 to 23 inches; yellowish brown silty clay that has light brownish gray mottles
23 to 42 inches; mottled yellowish brown, grayish brown, and strong brown silty clay
42 to 53 inches; yellowish brown silty clay that has light brownish gray and strong brown mottles
53 to 60 inches; mottled light brownish gray, strong brown, and yellowish brown silty clay loam that has pockets of silty clay

Included with this soil in mapping are small areas of the poorly drained Melvin soils in slight depressions and intermingled areas of the somewhat poorly drained Newark and the moderately well drained Wolftever soils. Also included are a few narrow strips of the moderately well drained Tarklin soils adjacent to steep upland side slopes.

Important soil properties—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: Occasional, very brief, usually in winter and early spring
Seasonal high water table: At a depth of 1 to 2 feet in winter and spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or as woodland. In a few areas it is used for crops, mainly grain sorghum and soybeans.

This soil is moderately suited to row crops. The flooding and the seasonal wetness are the major management concerns. The seasonal wetness makes the soil difficult to cultivate until late in spring. Crops respond well to applications of fertilizer and lime, and moderately high yields can be attained.

This soil is well suited to pasture and hay, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the seasonal high water table, the soil is soggy and is too soft for grazing for several weeks during winter and early spring.

This soil is well suited to trees, including yellow poplar, American sycamore, sweetgum, swamp white oak, green ash, cherrybark oak, and pin oak. The main concerns in managing timber are the susceptibility to compaction and rutting, the equipment limitation, and plant competition. Rutting and compaction are caused by the use of heavy equipment during wet periods. Logging during dry periods in summer and fall results in less damage to the soil and helps to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is not suited to most urban uses. The moderately slow permeability, the seasonal wetness, and the flooding are severe limitations on sites for septic tank absorption fields. The flooding and the seasonal wetness are severe limitations on sites for dwellings and commercial buildings. Low strength and the flooding are severe limitations on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The high content of clay in the subsoil, the seasonal wetness, and the flooding are severe limitations on sites for sanitary landfills.

The capability subclass is IIw.

ByB2—Byler silt loam, 2 to 5 percent slopes, eroded

This soil is very deep, gently sloping, and moderately well drained. It has a brittle, slowly permeable fragipan in the subsoil. It is on stream terraces (fig. 5) along the Cumberland and Harpeth Rivers and their major tributaries. Individual areas are about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches; yellowish brown silt loam

Subsoil:
9 to 18 inches; yellowish brown silt loam
18 to 24 inches; yellowish brown silty clay loam that has pale brown and light yellowish brown mottles
24 to 44 inches; a fragipan of mottled yellowish brown, light gray, strong brown, and light brownish gray silty clay loam
44 to 60 inches; mottled strong brown, gray, and light gray silty clay loam

Included with this soil in mapping are a few small areas of the somewhat poorly drained Newark soils in slight depressions. Also included are a few areas of the well drained Armour soils on slightly higher, convex knolls and the moderately well drained Tarklin soils on short side slopes.

Important soil properties—

Permeability: Moderate above the fragipan, slow in the fragipan
Available water capacity: Moderate
Soil reaction: Strongly acid or medium acid unless lime has been added
Flooding: None
Seasonal high water table: Perched above the fragipan at a depth of about 2 to 3 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly corn, wheat, and soybeans. In some areas it is used for tobacco, grain sorghum, pasture, or hay.

This soil is well suited to row crops and small grain. The restricted rooting depth, the available water capacity, and the hazard of erosion are the major management concerns. Root penetration is restricted to the part of the profile above the fragipan and to grayish vertical seams within the fragipan. Crops respond well to applications of fertilizer and lime, but they may experience moisture stress during dry summers because of the limited amount of available water. Cover crops, a suitable crop rotation, and conservation tillage help to control erosion and increase the water supply.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted

Figure 5.—An area of Byler silt loam, 2 to 5 percent slopes, eroded, on a stream terrace along the Cumberland River. The undulating typography is common on the stream terraces.

plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the perched water table, the soil is too soggy and is too soft for grazing for several days at a time during winter and early spring. Hay yields are moderate in dry years because of the limited amount of available water.

This soil is well suited to trees, including black walnut, white oak, southern red oak, yellow poplar, eastern white pine, and loblolly pine. Plant competition and the hazard of windthrow are the only management concerns. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slow permeability in the fragipan and the perched seasonal high water table are severe limitations on sites for septic tank absorption fields. Low strength is a moderate limitation on sites for local roads and streets. The seasonal wetness is a severe limitation on sites for dwellings with basements. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The seasonal wetness and the high content of clay in the subsoil are moderate limitations on sites for sanitary landfills.

The capability subclass is IIe.

ByC2—Byler silt loam, 5 to 12 percent slopes, eroded

This soil is very deep, sloping, and moderately well drained. It has a brittle, slowly permeable fragipan in the subsoil. It is on stream terraces along the Cumberland and Harpeth Rivers and their major tributaries. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches; yellowish brown silt loam

Subsoil:
9 to 18 inches; yellowish brown silt loam
18 to 24 inches; yellowish brown silty clay loam

that has pale brown and light yellowish brown mottles
24 to 44 inches; a fragipan of mottled yellowish brown, light gray, strong brown, and light brownish gray silty clay loam
44 to 60 inches; mottled strong brown, gray, and light gray silty clay loam

Included with this soil in mapping are a few small areas of the somewhat poorly drained Newark soils in slight depressions. Also included are a few areas of the well drained Armour soils on slightly higher, convex knolls and small, narrow strips of the moderately well drained Tarklin soils on short side slopes adjacent to the flood plains.

Important soil properties—

Permeability: Moderate above the fragipan, slow in the fragipan
Available water capacity: Moderate
Soil reaction: Strongly acid or medium acid
Flooding: None
Seasonal high water table: Perched above the fragipan at a depth of about 2 to 3 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly corn, wheat, and soybeans. In some areas it is used for grain sorghum, pasture, or hay or as woodland.

If managed properly, this soil is moderately suited to row crops and small grain. The restricted rooting depth, the available water capacity, and the hazard of erosion are the major management concerns. Root penetration is restricted to the part of the profile above the fragipan and to grayish vertical seams within the fragipan. Crops respond well to applications of fertilizer and lime, but they may experience moisture stress during dry summers because of the limited amount of available water. If a conservation tillage system, such as no-till planting, is used to help control erosion and increase the water supply, the soil will produce acceptable yields of soybeans, grain sorghum, and other hardy summer annuals. A drought in late summer can reduce the yields of corn and other crops that require a large amount of water. Cover crops, a suitable crop rotation, and conservation tillage help to control erosion.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the perched water table, the soil is too soggy and is too soft for grazing for several days at a time during winter and early spring. Hay yields are moderate or low in dry years because of the limited amount of available water.

This soil is well suited to trees, including black walnut, white oak, southern red oak, yellow poplar, eastern white pine, and loblolly pine. Plant competition and the hazard of windthrow are the only management concerns. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slow permeability in the fragipan and the perched seasonal high water table are severe limitations on sites for septic tank absorption fields. Low strength, the seasonal wetness, and the slope are moderate limitations on sites for local roads and streets. The seasonal wetness is a severe limitation on sites for dwellings with basements. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The seasonal wetness, the high content of clay in the subsoil, and the slope are moderate limitations on sites for sanitary landfills.

The capability subclass is IIIe.

DkB2—Dickson silt loam, 2 to 5 percent slopes, eroded

This soil is very deep, gently sloping, and moderately well drained. It has a brittle, slowly permeable fragipan in the subsoil. It is on undulating uplands, dominantly in the northern part of the county. Individual areas are about 5 to 150 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 9 inches; dark yellowish brown silt loam

Subsoil:
9 to 16 inches; yellowish brown silt loam
16 to 20 inches; yellowish brown silt loam that has strong brown and very pale brown mottles
20 to 25 inches; a fragipan of pale brown silt loam that has light gray, brownish yellow, and strong brown mottles
25 to 39 inches; a fragipan of mottled dark yellowish brown, yellowish brown, light gray, and gray silty clay loam
39 to 49 inches; a fragipan of mottled strong brown, red, gray, and light brownish gray silty clay loam

49 to 57 inches; strong brown silty clay that has red, light gray, and grayish brown mottles
57 to 72 inches; red silty clay that has grayish brown and strong brown mottles

Included with this soil in mapping are a few small areas of the somewhat poorly drained Taft soils in slight depressions and a few areas of the well drained Mountview soils on slightly higher, convex knolls. Also included, in the southern part of the county, are a few small areas of a Dickson soil that has a gravelly fragipan in the subsoil.

Important soil properties—

Permeability: Moderate above the fragipan, slow in the fragipan
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: Perched above the fragipan at a depth of about 1.5 to 2.0 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly tobacco, corn, and wheat. In some areas it is used for soybeans, hay, or pasture.

This soil is well suited to row crops (fig. 6) and small grain. The restricted rooting depth, the available water capacity, and the hazard of erosion are the major management concerns. Root penetration is restricted to the part of the profile above the fragipan and to grayish vertical seams within the fragipan. Crops respond well to applications of fertilizer and lime, but they may experience moisture stress during dry summers because of the limited amount of available water. Cover crops, a suitable crop rotation, and conservation tillage help to control erosion.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the perched water table, the soil is too soggy and is too soft for grazing for several days at a time during winter and early spring. Hay yields are moderate in dry years because of the limited amount of available water.

This soil is well suited to trees, including white oak, southern red oak, yellow poplar, eastern white pine, and loblolly pine. Plant competition and the hazard of windthrow are the only management concerns. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slow permeability in the fragipan and the perched seasonal high water table are severe limitations on sites for septic tank absorption fields. Low strength is a severe limitation on sites for local roads and streets. The seasonal wetness is a severe limitation on sites for dwellings with basements. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The seasonal wetness and the high content of clay in the subsoil are moderate limitations on sites for sanitary landfills.

The capability subclass is IIe.

En—Ennis gravelly silt loam, occasionally flooded

This soil is very deep, nearly level, and well drained. It is on narrow flood plains adjacent to steep uplands in all parts of the county. Slopes range from 0 to 3 percent. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 7 inches; brown gravelly silt loam

Subsoil:
7 to 30 inches; dark yellowish brown gravelly silt loam
30 to 40 inches; very dark grayish brown very gravelly silt loam

Substratum:
40 to 60 inches; dark brown very gravelly silty clay loam

Included with this soil in mapping are a few small areas of the well drained Humphreys soils on slightly higher knolls and the well drained Nolin soils in small depressions and in stream scours. Also included are areas of soils having a surface layer that is silt loam and is less than 10 inches thick and small areas of moderately well drained soils that are similar to the Ennis soil. The similar soils are in narrow strips adjacent to steep upland side slopes.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Very strongly acid to medium acid unless lime has been added

Figure 6.—Dickson silt loam, 2 to 5 percent slopes, eroded, produces high yields of dark-fired tobacco.

Seasonal high water table: None within 6 feet of the surface
Flooding: Occasional, very brief, usually in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay. In a few small areas, it is used for corn or small grain.

This soil is moderately suited to row crops. The major management concerns are the flooding, an abundance of gravel and cobbles on the surface, and the moderate available water capacity.

This soil is moderately suited to pasture and hay, but plant selection and management are important. Such plants as tall fescue and white clover grow well and can tolerate short periods of flooding. Alfalfa may be damaged in some years by flooding. Yields are reduced in dry summers because of the limited amount of available water.

This soil is well suited to trees, including yellow poplar, American sycamore, cherrybark oak, black walnut, and sweetgum. The main concerns in managing timber are seedling mortality and plant competition. The seedling mortality rate may be high in areas that are subject to flooding. Adequate site

preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

Because of the flooding, this soil is poorly suited to most urban uses. The flooding is a severe limitation on sites for septic tank absorption fields and for dwellings. The risk of corrosion on concrete in structures and underground utilities is moderate. The flooding and seepage are severe limitations on sites for sanitary landfills.

The capability subclass is IIw.

EwB2—Etowah silt loam, 2 to 5 percent slopes, eroded

This soil is very deep, gently sloping, and well drained. It is on foot slopes and stream terraces in the northern and central parts of the county. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches; dark yellowish brown silt loam

Subsoil:
5 to 34 inches; strong brown silty clay loam that has dark brown mottles
34 to 55 inches; yellowish red silty clay loam
55 to 60 inches; yellowish red silty clay loam that has reddish yellow mottles

Included with this soil in mapping are small areas of the well drained Sengtown and Minvale soils in slightly higher positions on hillsides and foot slopes. Also included are small, narrow strips of the well drained Nolin and Ennis soils along drainage channels.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly tobacco and corn. In some areas it is used for pasture or hay.

This soil is well suited to row crops. The small size and irregular shape of the individual areas of the map unit and the hazard of erosion are the major management concerns. If managed properly, the soil is highly productive and is well suited to all of the climatically adapted crops grown in the county. A suitable crop rotation, cover crops, and conservation tillage, including no-till planting, help to control erosion and maintain productivity. Crops respond well to applications of fertilizer and lime, and high yields can be attained.

This soil is well suited to pasture and hay. All of the climatically adapted forage plants grown in the county are suited. Alfalfa grows well and produces good yields in areas where the soil has been adequately limed and fertilized and has been properly managed.

This soil is well suited to trees, including yellow poplar, black walnut, southern red oak, white oak, loblolly pine, and eastern white pine. Plant competition is the only management concern. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability is a moderate limitation on sites for septic tank absorption fields. Low strength is a moderate limitation on sites for local roads and streets. The risk of corrosion on concrete in structures and underground utilities is moderate. The high content of clay in the subsoil is a moderate limitation on sites for sanitary landfills.

The capability subclass is IIe.

EwC2—Etowah silt loam, 5 to 12 percent slopes, eroded

This soil is very deep, sloping, and well drained. It is on foot slopes and stream terraces in the northern and central parts of the county. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches; dark yellowish brown silt loam

Subsoil:
5 to 34 inches; strong brown silty clay loam that has dark brown mottles
34 to 55 inches; yellowish red silty clay loam
55 to 60 inches; yellowish red silty clay loam that has reddish yellow mottles

Included with this soil in mapping are small areas of the well drained Sengtown and Minvale and the somewhat excessively drained Hawthorne soils in the slightly higher positions on steep side slopes. Also

included are small, narrow strips of the well drained Nolin and Ennis soils along drainage channels.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay. In some areas it is used for crops, mainly corn, small grain, and tobacco.

This soil is moderately suited to row crops. The slope, the hazard of erosion, and the small size and irregular shape of the individual areas of the map unit are the major management concerns. Crops respond well to applications of fertilizer and lime, and moderately high yields can be attained. A conservation tillage system, such as no-till planting, or contour stripcropping helps to control excessive erosion and runoff. Adding organic matter, such as manure, growing green manure crops, and returning crop residue to the soil help to conserve moisture and maintain good tilth. The small size and irregular shape of the individual areas of the map unit may cause difficulty in planting and harvesting some crops.

This soil is well suited to pasture and hay. All of the climatically adapted forage plants grown in the county are suited. Alfalfa grows well and produces good yields in areas where the soil has been adequately limed and fertilized and has been properly managed.

This soil is well suited to trees, including yellow poplar, black walnut, southern red oak, white oak, loblolly pine, and eastern white pine. Plant competition is the only management concern. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The slope and the restricted permeability are moderate limitations on sites for septic tank absorption fields. Low strength and the slope are moderate limitations on sites for local roads and streets. The slope is a moderate limitation on sites for dwellings and a severe limitation on sites for small commercial buildings. The risk of corrosion on concrete in structures and underground utilities is moderate. The slope and the high content of clay in the subsoil are moderate limitations on sites for sanitary landfills.

The capability subclass is IIIe.

Gu—Guthrie silt loam, occasionally flooded

This soil is very deep, nearly level, and poorly drained. It has a brittle, slowly permeable fragipan in the lower part of the subsoil. It is in depressions and on upland flats. Slopes range from 0 to 2 percent. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 7 inches; brown silt loam that has light brownish gray mottles

Subsurface layer:
7 to 17 inches; light brownish gray silt loam that has yellowish red and light brownish gray mottles

Subsoil:
17 to 40 inches; grayish brown silt loam that has yellowish red, yellowish brown, and light brownish gray mottles
40 to 62 inches; a fragipan of light brownish gray silt loam that has yellowish brown mottles

Included with this soil in mapping are small areas of the somewhat poorly drained Taft and the moderately well drained Dickson soils in the slightly higher, convex positions on the landscape.

Important soil properties—

Permeability: Slow
Available water capacity: High
Soil reaction: Extremely acid to strongly acid unless lime has been added
Flooding: Occasional, brief, usually in winter and spring; water may be ponded in some areas for several days
Seasonal high water table: Perched above the fragipan at a depth of 0.5 to 1.0 foot in winter and spring
Depth to bedrock: More than 5 feet

In most areas this soil is used as woodland. In a few areas it is used for pasture or hay.

This soil is poorly suited to crops. The seasonal wetness and the flooding are the main limitations. Most areas of the soil are small and irregular in shape and do not have suitable outlets for drainage. Planting, cultivating, and harvesting are often delayed following periods of heavy rainfall.

This soil is moderately suited to pasture and hay, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short

periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Because of the seasonal high water table and the flooding, the soil is too soggy and is too soft for grazing for several weeks at a time during winter and early spring.

This soil is well suited to water-tolerant hardwoods, including American sycamore, yellow poplar, willow oak, swamp white oak, cherrybark oak, and sweetgum. The main concerns in managing timber are susceptibility to compaction and rutting, plant competition, the equipment limitation, and seedling mortality. Rutting and compaction are caused by the use of heavy equipment during wet periods. Puddling also can occur when the soil is wet. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is not suited to most urban uses. The slow permeability, the seasonal wetness, and the flooding are severe limitations on sites for septic tank absorption fields and for dwellings. Low strength, the seasonal wetness, and the flooding are severe limitations on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The seasonal wetness and the flooding are severe limitations on sites for sanitary landfills.

The capability subclass is IVw.

HaC—Hawthorne gravelly silt loam, 5 to 12 percent slopes

This soil is moderately deep, sloping, and somewhat excessively drained. It is on ridgetops, mainly in the central and southern parts of the county. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 3 inches; brown gravelly silt loam

Subsurface layer:
3 to 6 inches; light yellowish brown gravelly silt loam that has brown mottles

Subsoil:
6 to 14 inches; strong brown very gravelly silt loam that has light yellowish brown mottles
14 to 33 inches; variegated strong brown, yellowish brown, light yellowish brown, and very pale brown very channery silt loam

Substratum:
33 to 60 inches; alternating strata of highly fractured siltstone and silty clay loam saprolite

Included with this soil in mapping are areas of soils that are not so deep over hard bedrock and small areas of the well drained Sengtown soils. The Sengtown soils are intermingled with areas of the Hawthorne soil on ridgetops. Also included are areas of moderately deep, well drained soils on foot slopes along the Cumberland River. The soils on the foot slopes have a clayey subsoil and formed in shale.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Strongly acid to extremely acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: Soft bedrock—20 to 40 inches; hard bedrock—more than 5 feet

In most areas this soil is used as woodland. In a few small areas, it is pastured.

This soil is poorly suited to row crops because of the low available water capacity, the depth to bedrock, and the rock fragments.

This soil is moderately suited to pasture and hay. The low available water capacity and the size of the individual areas of the map unit are the major management concerns. The rock fragments can hinder pasture improvement. Drought-tolerant grasses and legumes are best suited. Monitoring stocking rates helps to prevent overgrazing. Deep-rooted plants, such as alfalfa, are not suited because of the limited amount of available water and the depth to bedrock.

This soil is moderately suited to drought-tolerant trees, including eastern redcedar, white oak, mockernut hickory, chestnut oak, and Virginia pine. The main limitations in managing timber are seedling mortality and plant competition. Selecting drought-resistant species and planting on north-facing slopes reduce the seedling mortality rate. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The depth to bedrock is a severe limitation on sites for septic tank absorption fields. The slope is a moderate

limitation on sites for local roads and streets. The slope, the depth to bedrock, and the hazard of slippage are severe limitations on sites for small commercial buildings. The risk of corrosion on concrete in structures and underground utilities is severe. The depth to bedrock and seepage are severe limitations on sites for sanitary landfills.

The capability subclass is IVs.

HaD—Hawthorne gravelly silt loam, 12 to 20 percent slopes

This soil is moderately deep, moderately steep, and somewhat excessively drained. It is on hillsides and sloping ridges, mainly in the central and southern parts of the county. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 3 inches; brown gravelly silt loam

Subsurface layer:
3 to 6 inches; light yellowish brown gravelly silt loam that has brown mottles

Subsoil:
6 to 14 inches; strong brown very gravelly silt loam that has light yellowish brown mottles
14 to 33 inches; variegated strong brown, yellowish brown, light yellowish brown, and very pale brown very channery silt loam

Substratum:
33 to 60 inches; alternating strata of highly fractured siltstone and silty clay loam saprolite

Included with this soil in mapping are areas of soils that are not so deep to hard bedrock. Also included are small areas of the well drained Minvale soils. The Minvale soils are intermingled with areas of the Hawthorne soil on foot slopes.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Strongly acid to extremely acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: Soft bedrock—20 to 40 inches; hard bedrock—more than 5 feet

In most areas this soil is used as woodland. In a few small areas, it is pastured.

This soil is poorly suited to row crops because of the low available water capacity, the depth to bedrock, and the rock fragments.

This soil is poorly suited to pasture and hay. It is droughty because of the limited amount of available water, and as a result, yields are reduced. The rock fragments can hinder pasture improvement. Drought-tolerant grasses and legumes are best suited. Monitoring stocking rates helps to prevent overgrazing. Deep-rooted plants, such as alfalfa, are not suited because of the limited amount of available water and the depth to bedrock.

This soil is moderately suited to drought-tolerant trees, including eastern redcedar, white oak, mockernut hickory, chestnut oak, and Virginia pine. The main limitations in managing timber are seedling mortality, the equipment limitation, and plant competition. Selecting drought-resistant species and planting on north-facing slopes reduce the seedling mortality rate. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The depth to bedrock and the slope are severe limitations on sites for septic tank absorption fields. The slope is a severe limitation on sites for local roads and streets. The slope, the depth to bedrock, and the hazard of slippage are severe limitations on sites for dwellings and small commercial buildings. The risk of corrosion on concrete in structures and underground utilities is severe. The depth to bedrock, seepage, and the slope are severe limitations on sites for sanitary landfills.

The capability subclass is VIs.

HsF—Hawthorne-Sulphura association, steep

This map unit consists of moderately deep, steep and very steep, somewhat excessively drained soils. It is on the side slopes of highly dissected uplands in the central and southern parts of the county. The Hawthorne soil is on the upper and middle parts of slopes. It makes up about 60 percent of the unit. The Sulphura soil is on the lower part of slopes. It makes up about 20 percent of the unit. Individual areas are about 25 to 400 acres in size.

The typical sequence, depth, and composition of the layers in the Hawthorne soil are as follows—

Surface layer:
0 to 3 inches; brown gravelly silt loam

Subsurface layer:
3 to 6 inches; light yellowish brown gravelly silt loam that has brown mottles

Subsoil:
6 to 14 inches; strong brown very gravelly silt loam that has strong brown and light yellowish brown mottles
14 to 33 inches; variegated strong brown, yellowish brown, light yellowish brown, and very pale brown very channery silt loam

Substratum:
33 to 60 inches; alternating strata of highly fractured siltstone and silty clay loam saprolite

The typical sequence, depth, and composition of the layers in the Sulphura soil are as follows—

Surface layer:
0 to 3 inches; brown gravelly silt loam

Subsurface layer:
3 to 10 inches; yellowish brown gravelly silt loam

Subsoil:
10 to 22 inches; yellowish brown very channery silt loam

Bedrock:
22 inches; hard, gray limestone bedrock

Included with these soils in mapping are areas of similar soils that are less than 20 inches deep over hard bedrock, small areas of Sengtown soils, and small areas of Minvale soils on foot slopes. The Sengtown soils are intermingled with areas of the Hawthorne soil on the upper shoulders of side slopes. Also included are areas of a deep, very gravelly, loamy soil at the base of steep side slopes. This loamy soil formed in colluvium.

Important soil properties of the Hawthorne soil—

Permeability: Moderately rapid
Available water capacity: Low
Soil reaction: Strongly acid to extremely acid
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: Soft bedrock—20 to 40 inches

Important soil properties of the Sulphura soil—

Permeability: Moderate
Available water capacity: Low
Soil reaction: Strongly acid or medium acid in the upper part of the profile and strongly acid to slightly acid in the lower part
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: Hard bedrock—20 to 40 inches

In most areas these soils are used as woodland. They are pastured in a few of the less sloping, small areas.

These soils are not suited to row crops because of the limited available water capacity, the depth to bedrock, the slope, and the rock fragments.

These soils are poorly suited to pasture and hay. They are droughty because of the limited amount of available water, and as a result, yields are reduced. The slope and the rock fragments can hinder uniform grazing and pasture improvement. Slopes of more than 30 percent may hinder the safe operation of farm equipment used to broadcast seed or to apply fertilizer or herbicides unless access roads are built on the contour. Drought-tolerant grasses and legumes are best suited. Monitoring stocking rates helps to prevent overgrazing. Deep-rooted plants, such as alfalfa, are not suited because of the limited amount of available water and the depth to bedrock.

These soils are moderately suited to drought-tolerant trees, including eastern redcedar, white oak, mockernut hickory, chestnut oak, and Virginia pine. The main limitations in managing timber are the hazard of erosion, the equipment limitation, seedling mortality, and plant competition. Wheeled and tracked equipment can be used in the moderately steep areas, but more specialized harvesting methods, such as cable yarding, is safer and disturbs the soil less in steeper areas. Selecting drought-resistant species and planting on north-facing slopes reduce the seedling mortality rate. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

These soils are poorly suited to most urban uses. The depth to bedrock and the slope are severe limitations on sites for septic tank absorption fields. The slope is a severe limitation on sites for local roads and streets. The slope, the depth to bedrock, and the hazard of slippage are severe limitations on sites for dwellings and commercial buildings. The risk of corrosion on concrete in structures and underground utilities is severe. The depth to bedrock, seepage, and the slope are severe limitations on sites for sanitary landfills.

The capability subclass is VIIs.

HuB—Humphreys gravelly silt loam, 2 to 5 percent slopes

This soil is very deep, gently sloping, and well drained. It is on foot slopes and stream terraces. Individual areas are 4 to 10 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches; very dark grayish brown gravelly silt loam

Subsoil:
8 to 14 inches; dark yellowish brown gravelly silt loam
14 to 51 inches; yellowish brown gravelly silty clay loam that has brown and brownish yellow mottles
51 to 60 inches; yellowish brown gravelly silty clay loam

Included with this soil in mapping are a few small areas of the well drained Ennis soils adjacent to narrow stream channels. Also included are small strips of the moderately well drained Tarklin soils on side slopes adjacent to flood plains and a few areas of Minvale soils in the slightly higher landscape positions.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Very strongly acid to medium acid unless lime has been added
Flooding: None
Seasonal high water table: At a depth of 5 to 6 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay. In a few small areas, it is used for crops, mainly corn, soybeans, and small grain.

This soil is moderately suited to row crops. The major management concerns are the small size of the individual areas of the map unit, the moderate available water capacity, and the hazard of erosion.

This soil is well suited to pasture and hay. It is suited to most of the climatically adapted forage plants grown in the county. Yields are moderate or low in dry years because of the limited amount of available water.

This soil is well suited to trees, including yellow poplar, white oak, white ash, hickory, sweetgum, and loblolly pine. The main limitation for managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is well suited to most urban uses. It is only moderately suited to septic tank absorption fields and to dwellings with basements because of the seasonal high water table. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The seasonal high water table and seepage are severe limitations on sites for sanitary landfills.

The capability subclass is IIe.

HuC—Humphreys gravelly silt loam, 5 to 12 percent slopes

This soil is very deep, sloping, and well drained. It is on foot slopes and stream terraces. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches; very dark grayish brown gravelly silt loam

Subsoil:
8 to 14 inches; dark yellowish brown gravelly silt loam
14 to 51 inches; yellowish brown gravelly silty clay loam that has brown and brownish yellow mottles
51 to 60 inches; yellowish brown gravelly silty clay loam

Included with this soil in mapping are a few small areas of the well drained Ennis soils adjacent to narrow stream channels. Also included are small strips of the moderately well drained Tarklin soils on side slopes adjacent to flood plains and a few small areas of the well drained Minvale soils in the slightly higher landscape positions.

Important soil properties—

Permeability: Moderately rapid
Available water capacity: Moderate
Soil reaction: Very strongly acid to medium acid unless lime has been added
Flooding: None
Seasonal high water table: At a depth of 5 to 6 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay or as woodland. In a few small areas, it is used for crops, mainly corn and small grain.

This soil is moderately suited to row crops. The major management concerns are the hazard of erosion, rock fragments on the surface, and the moderate available water capacity. Cover crops, a suitable crop rotation, and conservation tillage help to increase the water supply and to control erosion.

This soil is well suited to pasture and hay. It is suited to most of the climatically adapted forage plants grown in the county. Yields are moderate in dry years because of the limited amount of available water.

This soil is well suited to trees, including yellow poplar, white oak, white ash, hickory, sweetgum, and loblolly pine. The main limitation for managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The slope is a moderate limitation on sites for septic tank absorption fields, for dwellings, and for local roads and street. It is a severe limitation on sites for small commercial buildings. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The seasonal high water table and seepage are severe limitations on sites for sanitary landfills.

The capability subclass is IIIe.

Ld—Lindside silt loam, occasionally flooded

This soil is very deep, nearly level, and moderately well drained. It is on flood plains. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches; brown silt loam

Subsoil:
6 to 11 inches; yellowish brown silt loam
11 to 20 inches; yellowish brown silt loam that has brown and pale brown mottles
20 to 36 inches; brown silt loam that has light brownish gray, pale brown, and dark brown mottles
36 to 42 inches; light brownish gray silt loam that has strong brown mottles

Substratum:
42 to 52 inches; grayish brown silt loam that has strong brown and yellowish red mottles
52 to 60 inches; gray silt loam

Included with this soil in mapping are small, narrow strips of the well drained Nolin and Ennis soils on flood plains adjacent to stream channels and small areas of the somewhat poorly drained Newark and the poorly drained Melvin soils in slight depressions and in old stream channels. Also included are a few areas of the well drained Arrington soils on the wider flood plains. The Arrington soils are intermingled with areas of the Lindside soil along drainage channels.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid to mildly alkaline in the upper part and medium acid to mildly alkaline in the lower part
Flooding: Occasional, very brief, usually in winter and early spring
Seasonal high water table: At a depth of 1.5 to 3.0 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly corn, soybeans, wheat, grain sorghum, and tobacco. In a few areas it is used as woodland or for pasture or hay.

This soil is well suited to row crops. Most of the climatically adapted crops raised in the county grow well, and good yields can be attained. The soil can produce high yields of small grain crops, but the crops can be damaged by the flooding. Lime and fertilizer, which should be applied according to the results of soil tests, are needed for sustained yields.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa, because of the seasonal high water table and the flooding. Stands of these plants start to thin out after the first or second year. Because of the seasonal high water table, the soil is too soggy and is too soft for grazing for several weeks at a time during winter and early spring.

This soil is well suited to trees, including black walnut, yellow poplar, American sycamore, sweetgum, and cherrybark oak. Plant competition is the only significant management concern. Adequate site preparation and maintenance are needed to prevent undesirable plants from interfering with natural or artificial reforestation.

This soil is not suited to most urban uses because of the flooding and the seasonal wetness. The flooding is a severe limitation on sites for small commercial buildings and for local roads and streets. The flooding and the seasonal wetness are severe limitations on

sites for septic tank absorption fields, sanitary landfills, and dwellings with basements. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate.

The capability subclass is IIw.

Me—Melvin silt loam, frequently flooded

This soil is very deep, nearly level, and poorly drained. It is on flood plains along the Cumberland and Harpeth Rivers. Slopes range from 0 to 2 percent. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 10 inches; brown silt loam that has reddish brown and grayish brown mottles

Subsoil:
10 to 20 inches; light brownish gray silt loam that has strong brown and reddish brown mottles

Substratum:
20 to 42 inches; light brownish gray silt loam that has strong brown, reddish brown, and grayish brown mottles
42 to 60 inches; gray silty clay loam that has strong brown, reddish brown, and light brownish gray mottles

Included with this soil in mapping are small areas of the somewhat poorly drained Newark soils in the slightly higher positions on the flood plains and the moderately well drained Byler and the somewhat poorly drained Beason soils on gently sloping and nearly level stream terraces. Also included are small areas of a poorly drained soil that has a clayey subsoil. The poorly drained soil is adjacent to very steep rock bluffs along the Cumberland River.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Medium acid to mildly alkaline
Flooding: Frequent, long, usually in late winter and early spring; water may be ponded for several days
Seasonal high water table: Within a depth of 1 foot in late winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used as woodland. In a few small areas, it is pastured. Many areas of the soil along the Cumberland River are flooded each year by the Tennessee Wildlife Resources Agency and converted to artificial wetland impoundments for migrating waterfowl. These impoundment areas are drained each spring by a system of levees and drainage outlets.

This soil is poorly suited to row crops. The wetness and the flooding are severe limitations if the soil is used for most row crops.

This soil is only moderately suited to hay and pasture because of the flooding and the seasonal wetness. It is best suited to water-tolerant plants, such as tall fescue and white clover.

This soil is well suited to water-tolerant trees. It provides excellent food and cover for wildlife. American sycamore, sweetgum, willow oak, cherrybark oak, swamp white oak, green ash, shagbark hickory, and pin oak are among the climatically adapted species in areas that are flooded for short periods of time. Baldcypress, sweetgum, green ash, swamp tupelo, and black willow are among the climatically adapted species in the small included areas that are ponded for extended periods. The main concerns in managing timber are the susceptibility to compaction and rutting, the equipment limitation, seedling mortality, the hazard of windthrow, and plant competition. Rutting and compaction are caused by using heavy equipment during wet periods. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. The seedling mortality rate and the hazard of windthrow may be high in areas that are subject to flooding and ponding. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural and artificial reforestation.

This soil is not suited to urban uses because of the flooding and the wetness. Low strength, the seasonal wetness, and the flooding are severe limitations on sites for local roads and streets. The flooding and the wetness are severe limitations on sites for dwellings, septic tank absorption fields, and sanitary landfills. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe.

The capability subclass is IVw.

MnC2—Minvale gravelly silt loam, 5 to 12 percent slopes, eroded

This soil is very deep, sloping, and well drained. It formed in cherty colluvium on foot slopes. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches; brown gravelly silt loam

Subsoil:
8 to 18 inches; brown gravelly silt loam that has dark yellowish brown mottles
18 to 60 inches; yellowish red gravelly silty clay loam that has strong brown mottles

Included with this soil in mapping are small areas of the well drained Etowah soils in landscape positions similar to those of the Minvale soil. The Etowah soils are intermingled with areas of the Minvale soil on stream terraces and foot slopes. Also included are small areas of the moderately well drained Tarklin soils in narrow strips adjacent to flood plains.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay or as woodland. In a few small areas, it is used for crops, mainly tobacco, small grain, and corn.

This soil is moderately suited to row crops. The small size and location of the individual areas of the map unit, the slope, and the hazard of erosion are the main management concerns. If managed properly, the soil is moderately productive and is suited to most of the climatically adapted crops grown in the county. A suitable conservation tillage system is needed to prevent further erosion. No-till planting, contour farming, and stripcropping can help to prevent excessive erosion and maintain productivity.

This soil is well suited to hay and pasture (fig. 7). It is suited to most of the climatically adapted forage crops that are grown in the county, including alfalfa. No significant limitations affect forage production if erosion is controlled.

This soil is well suited to trees, including yellow poplar, white oak, southern red oak, hickory, eastern redcedar, and loblolly pine. The main limitation for managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability and the slope are moderate limitations on sites for septic tank absorption fields. The slope is a moderate limitation on sites for dwellings and a severe limitation on sites for small commercial buildings. Low strength and the slope are moderate limitations on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The slope and the high content of clay in the subsoil are moderate limitations on sites for sanitary landfills.

The capability subclass is IIIe.

MnD2—Minvale gravelly silt loam, 12 to 20 percent slopes, eroded

This soil is very deep, moderately steep, and well drained. It formed in cherty colluvium on foot slopes. Individual areas are about 5 to 25 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches; brown gravelly silt loam

Subsoil:
8 to 18 inches; brown gravelly silt loam that has dark yellowish brown mottles
18 to 60 inches; yellowish red gravelly silty clay loam that has strong brown mottles

Included with this soil in mapping are small areas of the well drained Etowah soils in landscape positions similar to those of the Minvale soil. The Etowah soils are intermingled with areas of the Minvale soil on foot slopes. Also included are small areas of the moderately well drained Tarklin soils in narrow strips adjacent to flood plains and small areas of a well drained soil having very gravelly textures.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used as woodland. In a few areas it is pastured. It is poorly suited to row crops because of the slope and the hazard of erosion.

This soil is moderately suited to pasture and hay. It is suited to most of the climatically adapted forage crops that are grown in the county, including alfalfa.

Figure 7.—An area of Minvale gravelly silt loam, 5 to 12 percent slopes, eroded, in the foreground and Sengtown soils in the background. These soils are well suited to hay and pasture.

Care should be taken to prevent overgrazing, especially on the steeper slopes, in order to minimize erosion.

This soil is well suited to trees, including yellow poplar, white oak, southern red oak, hickory, eastern redcedar, and loblolly pine. The main concerns in managing timber are the hazard of erosion, the equipment limitation, and plant competition. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slope is a severe limitation for most uses. It can be overcome for some uses by designing structures and facilities so that they conform to the natural slope. Some moderate limitations also need to be considered during the design process.

The capability subclass is IVe.

MtB2—Mountview silt loam, 2 to 5 percent slopes, eroded

This soil is very deep, gently sloping, and well drained. It is on upland ridgetops. Individual areas are 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:

0 to 6 inches; yellowish brown silt loam

Subsoil:
6 to 13 inches; strong brown silty clay loam that has yellowish brown mottles
13 to 23 inches; strong brown silty clay loam
23 to 30 inches; yellowish red gravelly clay that has red and strong brown mottles
30 to 60 inches; red gravelly clay that has brownish yellow, yellowish brown, and red mottles

Included with this soil in mapping are small areas of the moderately well drained Dickson soils in saddles and slight depressions, small areas of the well drained Sengtown soils in sloping areas adjacent to the steeper side slopes, and many areas of Mountview soils that have a thin, brittle layer above the clayey subsoil. Also included are areas of the somewhat excessively drained Hawthorne soils in the slightly lower positions on ridges in the southern part of the county.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly tobacco, corn, and wheat. In some areas it is used for pasture or hay. In a few small areas, it is used as woodland.

This soil is well suited to row crops. If managed properly, this soil is highly productive and is suited to all of the climatically adapted crops grown in the county. A suitable conservation tillage system is needed to prevent further erosion. No-till planting, contour farming, and stripcropping help to control erosion and maintain productivity.

This soil is well suited to hay and pasture. It is suited to most of the climatically adapted forage crops that are grown in the county, including alfalfa. No significant limitations affect forage production if erosion is controlled.

This soil is well suited to trees, including yellow poplar, white oak, southern red oak, hickory, and eastern white pine. Plant competition is the only significant management concern for timber production. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability is a moderate limitation on sites for septic tank absorption fields. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The high content of clay in the lower part of the subsoil is a severe limitation on sites for sanitary landfills.

The capability subclass is IIe.

MtC2—Mountview silt loam, 5 to 12 percent slopes, eroded

This soil is very deep, sloping, and well drained. It is on side slopes and undulating ridgetops throughout the county. Individual areas are about 5 to 150 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches; yellowish brown silt loam

Subsoil:
6 to 13 inches; strong brown silty clay loam that has yellowish brown mottles
13 to 23 inches; strong brown silty clay loam
23 to 30 inches; yellowish red gravelly clay that has red and strong brown mottles
30 to 60 inches; red gravelly clay that has brownish yellow, yellowish brown, and red mottles

Included with this soil in mapping are small areas of the moderately well drained Dickson soils in saddles and slight depressions, small areas of the well drained Sengtown soils in sloping areas adjacent to the steeper side slopes, and many areas of Mountview soils that have a thin, brittle layer above the clayey subsoil. Also included are areas of the somewhat excessively drained Hawthorne soils in the slightly lower positions on ridges in the southern part of the county.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Very strongly or strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly tobacco, small grain, and corn. In some areas it is used for pasture or hay.

This soil is moderately suited to row crops. The hazard of erosion, the slope, and the steep slopes of adjacent soils are the major management concerns. Crops respond well to applications of fertilizer and lime, and moderately high yields can be attained. A well establish conservation tillage system, such as no-till planting, or contour stripcropping helps to control excessive erosion and runoff. Adding organic matter, such as manure, growing green manure crops, and returning crop residue to the soil help to conserve moisture and maintain good tilth.

This soil is well suited to hay and pasture. Most forage crops, including alfalfa, grow well and produce high yields in areas where the soil has been adequately limed and fertilized and has been properly managed. No significant limitations affect forage production if erosion is controlled.

This soil is well suited to trees, including yellow poplar, white oak, southern red oak, hickory, and eastern white pine. Plant competition is the only significant management concern for timber production. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability and the slope are moderate limitations on sites for septic tank absorption fields. A moderate shrink-swell potential and the slope are limitations on sites for dwellings with basements. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is moderate. The high content of clay in the lower part of the subsoil is a severe limitation on sites for sanitary landfills.

The capability subclass is IIIe.

Ne—Newark silt loam, frequently flooded

This soil is very deep, nearly level, and somewhat poorly drained. It is on flood plains along the Cumberland and Harpeth Rivers and their larger tributaries. Slopes range from 0 to 2 percent. Individual areas are 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 7 inches; brown silt loam

Subsoil:
7 to 16 inches; brown silt loam that has light brownish gray and yellowish red mottles
16 to 26 inches; light brownish gray silty clay loam that has pale brown and yellowish red mottles

Substratum:
26 to 43 inches; gray silty clay loam that has light brownish gray and yellowish red mottles
43 to 60 inches; gray silty clay that has reddish yellow, yellowish red, and red mottles

Included with this soil in mapping are small areas of the poorly drained Melvin soils in slight depressions. Also included are small areas of the somewhat poorly drained Beason soils on low stream terraces.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Medium acid to mildly alkaline
Flooding: Frequent, long, usually in winter and early spring
Seasonal high water table: At a depth of 0.5 foot to 1.5 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used as woodland or pasture. In a few areas it is used as cropland.

This soil is moderately suited to row crops. Short-season annual crops, such as soybeans and grain sorghum, produce moderately high yields. Except in areas where it is drained, the soil is poorly suited to corn because of the seasonal wetness and the flooding in early spring. Planting, cultivating, and harvesting operations are often delayed following periods of heavy rainfall. Lime and fertilizer, which should be applied according to the results of soil tests, are needed for sustained yields.

This soil is well suited to pasture if the proper mixture of pasture plants is selected. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants thin out prematurely. Because of the seasonal high water table, the soil is soggy and is too soft for grazing for several weeks during winter and early spring.

This soil is well suited to water-tolerant hardwoods, including American sycamore, cherrybark oak, Shumard oak, overcup oak, yellow poplar, and sweetgum. The main limitations in managing timber are the susceptibility to compaction and rutting, the

hazard of windthrow, and plant competition. Rutting and compaction are caused by the use of heavy equipment during wet periods. Puddling also can occur when the soil is wet. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. The hazard of windthrow may be high in areas that are subject to flooding. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses because of the flooding and the seasonal wetness. Low strength, the seasonal wetness, and the flooding are severe limitations on sites for local roads and streets. The flooding and the seasonal wetness are severe limitations on sites for septic tank absorption fields, dwellings, small commercial buildings, and sanitary landfills. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe.

The capability subclass is IIIw.

No—Nolin silt loam, occasionally flooded

This soil is very deep, nearly level, and well drained. It is on flood plains and in the bottom of large sinkholes. Slopes range from 0 to 2 percent. Individual areas are about 5 to 200 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches; brown silt loam

Subsoil:
6 to 26 inches; dark yellowish brown silt loam
26 to 60 inches; brown silt loam that has yellowish brown mottles

Included with this soil in mapping are small areas of the moderately well drained Lindside soils in slight depressions and in narrow strips adjacent to steep upland side slopes and areas of the well drained Ennis soils in narrow strips adjacent to stream channels. Also included are small areas of the well drained Arrington soils. The Arrington soils are intermingled with areas of the Nolin soil on the larger flood plains.

Important soil properties—

Permeability: Moderate
Available water capacity: High
Soil reaction: Medium acid to moderately alkaline
Flooding: Occasional, brief, usually in winter and early spring
Seasonal high water table: At a depth of 3 to 6 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for crops, mainly tobacco, corn, soybeans, and wheat. In some areas it is used for hay or pasture.

This soil is well suited to row crops (fig. 8). Most of the climatically adapted crops raised in the county grow well, and good yields can be attained. The soil can produce high yields of small grain crops, but the crops can be damaged by the flooding. Lime and fertilizer, which should be applied according to the results of soil tests, are needed for sustained yields.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover are not normally damaged by the flooding, but alfalfa is damaged in some years.

This soil is well suited to trees, including black walnut, ash, yellow poplar, American sycamore, sweetgum, and cherrybark oak. The main concerns in managing timber are plant competition and the susceptibility to compaction and rutting. Rutting and compaction are caused by the use of heavy equipment during wet periods. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses because of the flooding. The flooding is a severe limitation on sites for septic tank absorption fields, dwellings, and small commercial buildings. The flooding and low strength are severe limitations on sites for local roads and streets. The risk of corrosion on concrete in structures and underground utilities is moderate. The flooding and the wetness are severe limitations on sites for sanitary landfills.

The capability subclass is IIw.

Pt—Pits, quarry

This map unit consists of areas that are actively being used as limestone quarries. The areas have had the soil material removed down to the hard bedrock. The hard bedrock is being drilled and blasted for a variety of uses in the local area. The major use is for gravel in the transportation and construction industries. The vertical side walls consist of hard limestone bedrock. Normally, an area adjacent to the site is used to deposit the soil overburden and

Figure 8.—An area of Nolin silt loam, occasionally flooded, which is well suited to most agricultural uses but is poorly suited to most urban uses because of the flooding.

undesirable rock material. The spoil areas will be used when the area is being reclaimed to vegetation. Several of the areas adjacent to active quarries have been planted to trees and permanent grasses.

No capability classification is assigned.

Rc—Rock outcrop, very steep

This map unit consists of vertical bluffs along the Cumberland and Harpeth Rivers and along some of their major tributaries. Slopes range from 60 to more than 100 percent. Most of the unit consists of siltstone and limestone bedrock, with a few areas of talus on rock benches and in rock seams. A few areas have thin layers of loamy soil material less than 12 inches deep over hard bedrock. The majority of these areas are sparsely vegetated with eastern redcedar and shrubs growing in rock seams and along ledges where talus material has accumulated.

No capability classification is assigned.

SgB2—Sengtown gravelly silt loam, 2 to 5 percent slopes, eroded

This soil is very deep, gently sloping, and well drained. It is on ridgetops of dissected

uplands. Individual areas are about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches; brown gravelly silt loam

Subsoil:
5 to 15 inches; yellowish red gravelly silty clay loam that has red mottles
15 to 68 inches; red gravelly clay that has yellowish brown mottles

Included with this soil in mapping are a few small areas of the moderately well drained Dickson soils in saddles and a few small areas of the well drained Mountview soils. The Mountview soils are intermingled with areas of the Sengtown soil on ridgetops. Also included in many areas in the southern part of the county is a soil with a surface layer that is deeper than is typical.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Medium acid to very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used as for pasture or hay. In some areas it is used for tobacco, wheat, or alfalfa hay.

This soil is moderately suited to row crops. The small size and irregular shape of the individual areas in the map unit, the hazard of erosion, and the moderate available water capacity are the major management concerns. A suitable crop rotation, cover crops, and conservation tillage help to control excessive erosion and runoff. Crops respond well to applications of fertilizer and lime. Rock fragments hinder cultivation in some areas.

This soil is well suited to hay and pasture. It is suited to all of the climatically adapted plants grown in the county. Alfalfa and other high-quality forage plants respond well to management. No significant limitations affect forage production if erosion is controlled.

This soil is well suited to trees. Species suited to north-facing slopes include eastern white pine, yellow poplar, black walnut, white oak, hickory, ash, and southern red oak. Species suited to south-facing slopes include white oak, southern red oak, eastern redcedar, and loblolly pine. The main limitation in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability is a moderate limitation on sites for septic tank absorption fields. A shrink-swell potential is a moderate limitation on sites for dwellings and small commercial buildings. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The high content of clay in the subsoil is a severe limitation on sites for sanitary landfills.

The capability subclass is IIe.

SgC2—Sengtown gravelly silt loam, 5 to 12 percent slopes, eroded

This soil is very deep, sloping, and well drained. It is on ridgetops and the upper side slopes of uplands. Individual areas are about 5 to 250 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches; brown gravelly silt loam

Subsoil:
5 to 15 inches; yellowish red gravelly silty clay loam that has red mottles
15 to 68 inches; red gravelly clay that has yellowish brown mottles

Included with this soil in mapping are areas of karst landforms that are characterized by oval depressions or sinkholes. The well drained Nolin and the moderately well drained Lindside soils have formed in the bottom of many of the larger sinkholes. Also included are a few small areas of the moderately well drained Dickson soils in saddles, a few small areas of the well drained Mountview soils, and small areas of the somewhat excessively drained Hawthorne and Sulphura soils on steep, convex side slopes. The Mountview soils are intermingled with areas of the Sengtown soil on convex ridges. The Hawthorne and Sulphura soils are in the southern part of the county. Also included are small areas of a well drained soil that has a gravelly clay subsoil less than 60 inches deep over siltstone. This well drained soil is on sloping ridgetops in the central and southern parts of the county.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Medium acid to very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay or as woodland. In some areas it is used for tobacco, wheat, or alfalfa hay.

This soil is moderately suited to row crops. The hazard of erosion, the slope, the available water capacity, and the slopes of adjacent soils are the major management concerns. If properly managed, the soil can produce moderately high yields of all of the climatically adapted crops grown in the county. Contour farming, cover crops, a suitable crop rotation, and a conservation tillage system help to prevent further erosion.

This soil is well suited to hay and pasture. If properly managed, it can produce moderately high yields of tall fescue, white clover, orchardgrass, alfalfa, and sericea lespedeza. Forage plants grow well and produce good yields in areas where the soil has been adequately limed and fertilized and has been properly managed. Monitoring stocking rates helps to prevent overgrazing.

This soil is well suited to trees. Species suited to north-facing slopes include eastern white pine, yellow poplar, black walnut, white oak, hickory, ash, and southern red oak. Species suited to south-facing slopes include white oak, southern red oak, eastern redcedar, and loblolly pine. The main limitation in managing timber is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is moderately suited to most urban uses. The restricted permeability and the slope are moderate limitations on sites for septic tank absorption fields. A shrink-swell potential and the slope are moderate limitations on sites for dwellings. The slope is a severe limitation on sites for small commercial buildings. Low strength is a severe limitation on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The high content of clay in the subsoil is a severe limitation on sites for sanitary landfills.

The capability subclass is IIIe.

SgD2—Sengtown gravelly silt loam, 12 to 20 percent slopes, eroded

This soil is very deep, moderately steep, and well drained. It is on side slopes in the uplands. Individual areas are about 5 to 100 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 5 inches; brown gravelly silt loam

Subsoil:
5 to 15 inches; yellowish red gravelly silty clay loam that has red mottles
15 to 68 inches; red gravelly clay that has yellowish brown mottles

Included with this soil in mapping are small areas of Sengtown soils that have rock outcrop intermingled in the unit. Also included are small areas of the excessively well drained Hawthorne soils on steep, convex side slopes.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Medium acid to very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used as pasture or woodland. In some small areas it is used for alfalfa hay.

This soil is poorly suited to row crops because of the slope and the hazard of erosion. If row crops are grown, applying erosion-control measures, such as diversions, grassed waterways, stripcropping, and contour farming, reduces the hazard of erosion, but these measures generally will not fill long-term needs or provide for an economic return.

This soil is moderately suited to hay and pasture (fig. 9). If properly managed, it can produce moderate yields of tall fescue, white clover, orchardgrass, and service lespedeza. Forage plants grow well in areas where the soil has been adequately limed and fertilized and has been properly managed. Monitoring stocking rates helps to prevent overgrazing.

This soil is well suited to trees. Species suited to north-facing slopes include eastern white pine, yellow poplar, black walnut, white oak, hickory, ash, and southern red oak. Species suited to south-facing

Figure 9.—Sengtown gravelly silt loam, 12 to 20 percent slopes, eroded, is moderately suited to hay and pasture but is poorly suited to row crops and urban uses because of the slope.

slopes include white oak, southern red oak, eastern redcedar, and loblolly pine. The main limitations in managing timber are the hazard of erosion, the equipment limitation, and plant competition. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slope is a severe limitation on sites for septic tank absorption fields, dwellings, and small commercial buildings. Low strength and the slope are severe limitations on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The slope and the high content of clay in the subsoil are severe limitations on sites for sanitary landfills.

The capability subclass is IVe.

SgF—Sengtown gravelly silt loam, 20 to 60 percent slopes

This soil is very deep, steep and very steep, and well drained. It is on side slopes in the uplands in the northern and central parts of the county. Individual areas are about 10 to 150 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 3 inches; brown gravelly silt loam

Subsurface layer:
3 to 10 inches; light yellowish brown gravelly silt loam

Subsoil:
10 to 16 inches; strong brown gravelly silty clay loam that has yellowish red mottles

16 to 25 inches; yellowish red gravelly clay that has red mottles
25 to 60 inches; red gravelly clay that has reddish yellow and yellowish red mottles

Included with this soil in mapping are areas of rock outcrop along tributary drainageways. Also included are small areas of the well drained Minvale and Etowah soils on foot slopes and small areas of the somewhat excessively drained Hawthorne soils on very steep, convex side slopes.

Important soil properties—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Medium acid to very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

In most areas this soil is used as woodland. In a few of the less sloping areas, it is used as pasture. It is not suited to row crops because of the slope and the hazard of erosion.

This soil is poorly suited to hay and pasture. The slope, a high rate of runoff, and the hazard of erosion are the major management concerns. Slopes of more than 30 percent may hinder the safe operation of farm equipment used to broadcast seed or to apply fertilizer, lime, or herbicides unless access roads are built on the contour.

This soil is well suited to trees (fig. 10). Species suited to north-facing slopes include eastern white pine, yellow poplar, black walnut, white oak, hickory, ash, and southern red oak. Species suited to south-facing slopes include white oak, southern red oak, eastern redcedar, and loblolly pine. The main limitations in managing timber are the hazard of erosion, the equipment limitation, and plant competition. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil, reduce the hazard of erosion, and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slope is a severe limitation on sites for septic tank absorption fields, dwellings, and small commercial buildings. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The slope and the high content of clay in the subsoil are severe limitations on sites for sanitary landfills.

The capability subclass is VIIe.

SrF—Sengtown-Rock outcrop complex, 20 to 60 percent slopes

This map unit consists of a very deep, steep and very steep, well drained Sengtown soil intermingled with areas of hard limestone bedrock. It is dominantly in the northern part of the county. The Sengtown soil is on the upper part of the slopes, and the Rock outcrop is on the lower part. The Rock outcrop consists of hard, slightly fractured, horizontally bedded limestone. Individual areas of the unit are about 40 percent Sengtown soil and 40 percent Rock outcrop. They are about 10 to 150 acres in size.

The typical sequence, depth, and composition of the layers in the Sengtown soil are as follows—

Surface layer:
0 to 3 inches; brown gravelly silt loam

Subsurface layer:
3 to 10 inches; light yellowish brown gravelly silt loam

Subsoil:
10 to 16 inches; strong brown gravelly silty clay loam that has yellowish red mottles
16 to 25 inches; yellowish red gravelly clay that has red mottles
25 to 60 inches; red gravelly clay that has reddish yellow and yellowish red mottles

Included in this unit in mapping are small areas of the Minvale soils on toe slopes. Also included are areas of loamy soils on concave slopes above the limestone bedrock. These included loamy soils have more than 35 percent fragments in the subsoil.

Important soil properties of the Sengtown soil—

Permeability: Moderate
Available water capacity: Moderate
Soil reaction: Medium acid to very strongly acid
Flooding: None
Seasonal high water table: None within 6 feet of the surface
Depth to bedrock: More than 5 feet

All areas of this map unit are used as woodland. The unit is not suited to row crops because of the slope, the hazard of erosion, and the Rock outcrop. It

Figure 10.—An area of Sengtown gravelly silt loam, 20 to 60 percent slopes, that has been clearcut and planted to pines.

is poorly suited to hay and pasture because of the slope and the Rock outcrop.

This map unit is moderately suited to trees. The Sengtown soil is well suited to trees. Species suited to north-facing slopes include eastern white pine, yellow poplar, black walnut, white oak, hickory, ash, and southern red oak. Species suited to south-facing slopes include white oak, southern red oak, eastern redcedar, and loblolly pine. The main limitations in managing timber are the hazard of erosion, the equipment limitation, and plant competition. Most individual areas of the map unit are too small and too difficult to manage using conventional methods, and the cost of harvesting is too high to provide for an economic return. Reestablishing trees is difficult because of the slope and plant competition. Harvesting trees may increase the hazard of erosion.

This map unit is poorly suited to urban uses because of the slope and the Rock outcrop.

The capability subclass is VIIs.

Ta—Taft silt loam

This soil is very deep, nearly level, and somewhat poorly drained. It has a brittle, slowly permeable fragipan in the subsoil. It is on broad flats on uplands and terraces in the northern and central parts of the county. Slopes range from 0 to 2 percent. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:

0 to 9 inches; pale brown silt loam that has strong brown and brown mottles

Subsoil:

9 to 23 inches; light yellowish brown silt loam that has yellowish brown and light gray mottles

23 to 29 inches; light yellowish brown silt loam that has brownish yellow mottles and light brownish gray coatings on peds

29 to 37 inches; a fragipan of light yellowish brown silt loam that has light gray, gray, and yellowish brown mottles

37 to 50 inches; a fragipan of light brownish gray silty clay loam that has brownish yellow and light gray mottles

50 to 58 inches; a fragipan of light brownish gray silt loam that has yellowish brown, strong brown, and light gray mottles

58 to 62 inches; mottled gray, strong brown, brownish yellow, and light yellowish brown clay

Included with this soil in mapping are small areas of the moderately well drained Dickson soils on slightly higher, convex ridges. Also included are small areas of the poorly drained Guthrie soils in depressions and old drainage channels.

Important soil properties—

Permeability: Moderate above the fragipan; slow in the fragipan
Available water capacity: Moderate
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: None
Seasonal high water table: Perched above the fragipan at a depth of about 1 to 2 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay. In some areas it is used for crops, mainly soybeans. In a few small areas, it is used as woodland.

This soil is moderately suited to row crops. The restricted rooting depth and the perched seasonal high water table are the major management concerns. Root penetration is restricted to the part of the profile above the fragipan and to grayish vertical seams within the fragipan. The perched seasonal high water table makes the soil difficult to cultivate until late in spring. In some dry years yields may be reduced because of the limited amount of available water. Crops respond well to applications of fertilizer and lime, and moderately high yields can be attained if the soil is managed properly.

This soil is well suited to pasture and hay, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the perched seasonal high water table, the soil is too soggy and is too soft for grazing for several weeks during winter and early spring.

This soil is well suited to trees, including yellow poplar, sweetgum, white oak, American sycamore, shagbark hickory, and loblolly pine. The main concerns in managing timber are the susceptibility to compaction and rutting, seedling mortality, and plant competition. Rutting and compaction are caused by the use of heavy equipment during wet periods. Logging during dry periods in summer and fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. The seedling mortality rate may be high in areas that are subject to flooding or ponding. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slow permeability in the fragipan and the perched seasonal high water table are severe limitations on sites for septic tank absorption fields. Low strength is a severe limitation on sites for local roads and streets. The seasonal wetness is a severe limitation on sites for dwellings and small commercial buildings. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The seasonal wetness is a severe limitation on sites for sanitary landfills.

The capability subclass is IIIw.

TrB2—Tarklin gravelly silt loam, 2 to 5 percent slopes, eroded

This soil is deep, gently sloping, and moderately well drained. It has a brittle, slowly permeable fragipan in the subsoil. It is on stream terraces along the Cumberland and Harpeth Rivers. Individual areas are about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:

0 to 8 inches; brown gravelly silt loam

Subsoil:

8 to 16 inches; yellowish brown gravelly silt loam that has light yellowish brown and strong brown mottles

16 to 25 inches; strong brown gravelly silt loam that has light yellowish brown and strong brown mottles
25 to 60 inches; a fragipan of mottled strong brown, yellow, light yellowish brown, and light gray very gravelly silt loam

Included with this soil in mapping are a few small areas of the Byler soils and a few areas of the well drained Armour soils on slightly higher, convex knolls. The Byler soils are intermingled with areas of the Tarklin soil.

Important soil properties—

Permeability: Moderate above the fragipan, slow in the fragipan
Available water capacity: Moderate
Soil reaction: Strongly acid to extremely acid unless lime has been added
Flooding: None
Seasonal high water table: Perched above the fragipan at a depth of about 1.5 to 2.0 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay. In some small areas it is used as woodland.

This soil is moderately suited to row crops and small grain. The restricted rooting depth, the available water capacity, and the hazard of erosion are the major management concerns. Root penetration is restricted to the part of the profile above the fragipan and to grayish vertical seams within the fragipan. Crops respond well to applications of fertilizer and lime, but they may experience moisture stress during dry summers because of the limited amount of available water. Cover crops, a suitable crop rotation, and conservation tillage help to control erosion and increase the water supply.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the perched seasonal high water table, the soil is too soggy and is too soft for grazing for several days at a time during winter and early spring. Hay yields are moderate or low in dry years because of the limited amount of available water.

This soil is well suited to trees, including black walnut, yellow poplar, white oak, southern red oak, eastern white pine, and loblolly pine. The only significant management concern is plant competition. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slow permeability in the fragipan and the perched seasonal high water table are severe limitations on sites for septic tank absorption fields. The wetness is a moderate limitation on sites for local roads and streets and a severe limitation on sites for dwellings with basements. The risk of corrosion on concrete in structures and underground utilities is severe. The wetness and seepage are severe limitations on sites for sanitary landfills.

The capability subclass is IIe.

TrC2—Tarklin gravelly silt loam, 5 to 12 percent slopes, eroded

This soil is deep, sloping, and moderately well drained. It has a brittle, slowly permeable fragipan in the subsoil. It is on stream terraces along the Cumberland and Harpeth Rivers. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 8 inches; brown gravelly silt loam

Subsoil:
8 to 16 inches; yellowish brown gravelly silt loam that has light yellowish brown and strong brown mottles
16 to 25 inches; strong brown gravelly silt loam that has light yellowish brown and strong brown mottles
25 to 60 inches; a fragipan of mottled strong brown, yellow, light yellowish brown, and light gray very gravelly silt loam

Included with this soil in mapping are a few small areas of Byler soils. The Byler soils are intermingled with areas of the Tarklin soil. Also included are a few areas of the well drained Armour soils on slightly higher, convex knolls.

Important soil properties—

Permeability: Moderate above the fragipan, slow in the fragipan
Available water capacity: Moderate

Soil reaction: Strongly acid to extremely acid unless lime has been added
Flooding: None
Seasonal high water table: Perched above the fragipan at a depth of about 1.5 to 2.0 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used for pasture or hay. In some small areas it is used as woodland.

This soil is moderately suited to row crops and small grain. The restricted rooting depth, the available water capacity, and the hazard of erosion are the major management concerns. Root penetration is restricted to the part of the profile above the fragipan and to grayish vertical seams within the fragipan. Crops respond well to applications of fertilizer and lime, but they may experience moisture stress during dry summers because of the limited amount of available water. Cover crops, a suitable crop rotation, and conservation tillage help to control erosion and increase the water supply.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa. Stands of these plants start to thin out after the first or second year. Because of the perched seasonal high water table, the soil is too soggy and is too soft for grazing for several days at a time during winter and early spring. Hay yields are moderate or low in dry years because of the limited amount of available water.

This soil is well suited to trees, including black walnut, yellow poplar, white oak, southern red oak, eastern white pine, and loblolly pine. The main limitations for managing timber are plant competition and the susceptibility to compaction and rutting. Compaction and rutting are caused by using heavy equipment during wet periods. Logging during dry periods in summer and in fall and using low-pressure ground equipment result in less damage to the soil and help to maintain productivity. Adequate site preparation and maintenance are needed to keep undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The slow permeability in the fragipan and the perched seasonal high water table are severe limitations on sites for septic tank absorption fields. The wetness and the slope are moderate limitations on sites for local roads and streets. The wetness is a severe limitation on sites for dwellings with basements. The slope is a severe limitation on sites for small commercial buildings. The risk of corrosion on concrete in structures and underground utilities is severe. The wetness and seepage are severe limitations on sites for sanitary landfills.

The capability subclass is IIIe.

Ud—Udorthents, clayey

These soils are in borrow areas, in areas that have been graded and disturbed during the process of urbanization, and in landfill areas. In the borrow areas the soil material has been removed and used in the construction of roadbeds or as fill material for construction sites.

Borrow pits commonly are excavated to a depth of 10 to 50 feet. The soil material on the steep vertical side walls is comparable to that in the lower part of the subsoil of adjacent soils. The bottom of the pits consists of gravelly and bouldery clay.

In the areas that have been graded and disturbed in the process of urbanization, the upper 2 to 5 feet of soil material has been removed or reworked. The soil material remaining generally consists of clayey limestone residuum having common to many fragments of gravel, cobbles, and stones.

In the landfill areas the original soil material has been removed and solid waste has been added in alternating layers. Landfills that are no longer receiving waste material have been revegetated with trees or a permanent cover of grasses.

The exposed clayey material can support plants. Most areas of the unit have a cover of native grasses, shrubs, and trees. Some reclaimed areas have stands of eastern redcedar, shortleaf pine, and loblolly pine. Acidity, the restricted rooting depth in some areas, and the hazard of erosion are limiting features of the soil material. Because areas of the unit are so diverse, onsite investigation is needed before use and management are planned.

No capability classification is assigned.

WfA—Wolftever silty clay loam, 0 to 2 percent slopes, occasionally flooded

This soil is very deep, nearly level, and moderately well drained. It is on low stream terraces along the Cumberland River. Individual areas are about 5 to 50 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches; brown silty clay loam

Subsoil:
6 to 10 inches; dark yellowish brown silty clay loam that has brown mottles
10 to 22 inches; dark brown silty clay that has yellowish brown mottles
22 to 51 inches; yellowish brown silty clay that has yellowish brown and light gray mottles

Substratum:
51 to 60 inches; mottled light gray, yellowish brown, and brownish yellow silty clay loam

Included with this soil in mapping are small areas of the somewhat poorly drained Beason soils in slight depressions and small, narrow strips of well drained, loamy soils on natural levees on the Cumberland River. Also included are small areas of soils that are similar to the Wolftever soil but have a dark surface layer that is less than 20 inches thick.

Important soil properties—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: Occasional, very brief, usually in winter and early spring
Seasonal high water table: At a depth of 2.5 to 3.5 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is in pasture or hay. The remaining acreage is used for crops, mainly soybeans and grain sorghum.

This soil is moderately suited to row crops. The main limitations are the flooding and the seasonal wetness. Most short-season annuals, such as soybeans and grain sorghum, grow well, and moderately high yields (fig. 11) can be attained. Lime and fertilizer, which should be applied according to the results of soil tests, are needed for sustained yields.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa, because of the seasonal high water table and the flooding. Stands of these plants start to thin out after the first or second year. Because of the seasonal high water table, the soil is too soggy and is too soft for grazing for several weeks at a time during winter and early spring.

This soil is well suited to trees, including yellow poplar, black walnut, sweetgum, swamp white oak, cherrybark oak, American sycamore, and green ash. The main concerns in managing timber are plant competition and seedling mortality. Adequate site preparation and maintenance are needed to prevent undesirable plants from interfering with natural or artificial reforestation.

This soil is poorly suited to most urban uses. The flooding, the seasonal wetness, and the restricted permeability are severe limitations on sites for septic tank absorption fields. The flooding is a severe limitation on sites for dwellings and small commercial buildings. The flooding and low strength are severe limitations on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The flooding, the seasonal wetness, and the high content of clay in the subsoil are severe limitations on sites for sanitary landfills.

The capability subclass is IIw.

WfC—Wolftever silty clay loam, 5 to 12 percent slopes, occasionally flooded

This soil is very deep, sloping, and moderately well drained. It is on low stream terraces along the Cumberland River. Individual areas are about 5 to 20 acres in size.

The typical sequence, depth, and composition of the layers in this soil are as follows—

Surface layer:
0 to 6 inches; brown silty clay loam

Subsoil:
6 to 10 inches; dark yellowish brown silty clay loam that has brown mottles
10 to 22 inches; dark brown silty clay that has yellowish brown mottles
22 to 51 inches; yellowish brown silty clay that has yellowish brown and light gray mottles

Substratum:
51 to 60 inches; mottled light gray, yellowish brown, and brownish yellow silty clay loam

Included with this soil in mapping are small areas of the well drained Arrington soils adjacent to river channels. Also included are small, narrow strips of well drained, loamy soils on natural levees on the Cumberland River.

Figure 11.—An area of Wolftever silty clay loam, 0 to 2 percent slopes, occasionally flooded, which produces moderately high yields of grain sorghum.

Important soil properties—

Permeability: Moderately slow
Available water capacity: High
Soil reaction: Strongly acid or very strongly acid unless lime has been added
Flooding: Occasional, very brief, usually in winter and early spring
Seasonal high water table: At a depth of 2.5 to 3.5 feet in winter and early spring
Depth to bedrock: More than 5 feet

In most areas this soil is used as woodland. In several small areas it is used for crops, mainly soybeans. In a few small areas, it is in pasture or hay.

This soil is moderately suited to row crops. The main limitations are the flooding, the hazard of erosion, and the size and shape of the individual areas of the map unit. The soil generally occurs in long, narrow strips adjacent to intermittent streams. The size, shape, and variable slope make managing the soil difficult. Short-season row crops, such as soybeans, are best suited. A conservation tillage system, such as no-till planting, or contour stripcropping helps to control excessive erosion and runoff.

This soil is well suited to hay and pasture, but plant selection and good management are important. Such plants as tall fescue and white clover do not require a deep root zone and can tolerate short periods of wetness. The soil is poorly suited to deep-rooted plants that are sensitive to wetness, such as alfalfa, because of the seasonal high water table and the flooding. Stands of these plants start to thin out after the first or second year. Because of the seasonal high water table, the soil is too soggy and is too soft for grazing for several weeks at a time during winter and early spring.

This soil is well suited to trees, including yellow poplar, black walnut, sweetgum, swamp white oak, American sycamore, cherrybark oak, and green ash. The main concerns in managing timber are plant competition and seedling mortality. Adequate site preparation and maintenance are needed to prevent undesirable plants from interfering with natural or artificial reforestation

This soil is poorly suited to most urban uses. The flooding, the seasonal wetness, and the restricted permeability are severe limitations on sites for septic tank absorption fields. The flooding is a severe limitation on sites for dwellings and small commercial buildings. The flooding and low strength are severe limitations on sites for local roads and streets. The risk of corrosion on uncoated steel and concrete in structures and underground utilities is severe. The flooding, the seasonal wetness, and the high content of clay in the subsoil are severe limitations on sites for sanitary landfills.

The capability subclass is IIIe.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of the main crops and pasture plants are listed for each soil, the system of land capability classification used by the Natural Resources Conservation Service is explained, and prime farmland is described.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading “Detailed Soil Map Units.” Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

About 77,000 acres in the county is used for crops or pasture. Most of this acreage is in permanent pasture or is used as rotational cropland and pasture. The main crops are tobacco, corn, soybeans, grain sorghum, wheat, and hay. In recent years the acreage planted to these crops has been decreasing due to land use changes, a reduction in acreage allotments, and agricultural legislation. Cropland taken out of production has been returned to pasture or hay or used for residential development.

Pasture and hay crops make up a significant acreage of the farmland in the county. Most of the pasture and hay supports tall fescue and white clover. Alfalfa, lespedeza, orchardgrass, timothy, red clover, and vetch are becoming increasingly important as hay crops.

Erosion is a management concern in most of the county. Loss of soil through erosion is damaging for two reasons. First, productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. Loss of the surface layer is especially damaging on Dickson, Byler, and other soils that have a layer in the subsoil that limits the depth of roots. Secondly, controlling erosion minimizes the pollution of streams by sediments and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion-control practices provide a protective cover, reduce the runoff rate, and increase the rate of water infiltration. A cropping system that keeps a plant cover on the soil for extended periods reduces the hazard of erosion and preserves the productive capacity of the soils. Contour stripcropping, terraces, diversions, grassed waterways, contour farming, and conservation tillage reduce the runoff rate and hazard of erosion.

On livestock farms, which require pasture and hay,

including legumes and grasses in the cropping system helps to control erosion on sloping land, provide nitrogen, and improve tilth. Applications of fertilizer and lime are needed to maintain high-quality forage. In many areas pasture renovation is needed when the better forage plants have decreased to levels less than needed for optimum production. Adjusting stocking rates to the productivity of the soils helps to prevent overgrazing.

Most of the soils on uplands are strongly acid or very strongly acid. In unlimed areas ground limestone is needed to raise the pH level for the optimum growth of most field crops and forage. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the needs of the crop, and on the expected level of yields. The Cooperative Extension Service can help in determining the kinds and amounts of fertilizer and lime to be applied.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. The land capability classification of each map unit also is shown in the table.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for woodland or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use. No class V soils were identified in the county.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production. No class VIII soils were identified in the county.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of

erosion unless a close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of the map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

Prime Farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. The slope ranges mainly from 0 to 5 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

The map units in the survey area that are considered prime farmland are listed in table 6. This list does not constitute a recommendation for a particular land use. The extent of each listed map unit is shown in table 4. The location is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Woodland Management and Productivity

Micheal B. Huddleston, Tennessee Division of Forestry, helped prepare this section.

Prior to settlement, all of Cheatham County was forested. As the land was settled, many areas were cleared for agricultural and commercial uses. Nearly 103,000 acres, or about 52 percent of the acreage in the county, remains forested. Most of the forest land is in small, privately owned tracts. About 20,800 acres is in larger forested areas within the Cheatham Wildlife Management Area.

The deeper soils, which are in the northern part of the county, have the potential to produce high yields of commercial hardwoods. They include the Sengtown, Dickson, and Mountview soils. The steep, more shallow soils, which are in the central and southern parts of the county, have the potential to produce moderate yields of hardwoods. They include the Hawthorne and Sulphura soils. Most of the soils on stream terraces and bottom land have the potential to produce high yields of hardwoods.

At present, the forests in the county produce only about 50 percent of their potential. In most areas additional management is needed to achieve optimum productivity. Examples are removing or reducing understory competition, increasing stocking, and planting adapted species. Clearcutting and controlled burning in many areas will improve timber stands and reduce plant competition. Preventing livestock from grazing and roaming unrestricted in wooded areas helps to increase productivity and reduce erosion in small woodlots.

The commercial species commonly grown in the county include yellow poplar, upland and bottom-land oaks, black walnut, sweetgum, maple, hickory, American sycamore, wild cherry, American beech, white ash, elm, and eastern redcedar. Several small tracts have been planted to loblolly and shortleaf pines.

The forests of Cheatham County provide not only commercial wood products but also wildlife habitat, opportunities for recreation, and natural beauty. They help to conserve soil and water.

Soils vary in their ability to produce trees. Available water capacity and depth of the root zone have major effects on tree growth. Fertility and texture also

influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Elevation and aspect are of particular importance in mountainous areas.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to applications of fertilizer than others, some are more susceptible to landslides and erosion after roads are built and timber is harvested, and some require special reforestation efforts. In the section "Detailed Soil Map Units," the description of each map unit in the survey area suitable for timber includes information about productivity, limitations in harvesting timber, and management concerns in producing timber. Table 7 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation or harvesting activities expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion-control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of moderate or severe indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning harvesting and reforestation activities, or the use of special equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as slope, wetness, stoniness, and susceptibility of the surface layer to compaction. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On the steeper slopes, tracked equipment is needed. On the steepest slopes, even tracked equipment cannot be operated and more sophisticated systems are needed. The rating is *slight* if equipment use is restricted by wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if slopes are so steep that wheeled equipment cannot be operated safely across the slope, if wetness restricts equipment use from 2 to 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. The rating is *severe* if slopes are so steep that tracked equipment cannot be operated safely across the slope, if wetness restricts equipment use for more than 6 months per year, if stoniness restricts the use of ground-based equipment, or if special equipment is needed to prevent or minimize compaction. Ratings of moderate or severe indicate a need to choose the best suited equipment and to carefully plan the timing of harvesting and other management activities.

Ratings of *seedling mortality* refer to the probability of the death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall, as influenced by kinds of soil or topographic conditions. Seedling mortality is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth to a seasonal high water table and the length of the period when the water table is high, rock fragments in the surface layer, rooting depth, and the aspect of the slope. The mortality rate generally is highest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if expected mortality is between 25 and 50 percent; and *severe* if expected mortality exceeds 50 percent. Ratings of moderate or severe indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing a surface drainage system, and providing artificial shade for seedlings. Reinforcement planting is often needed if the risk is moderate or severe.

Ratings of *windthrow hazard* indicate the likelihood that trees will be uprooted by the wind. A restricted rooting depth is the main reason for windthrow. The rooting depth can be restricted by a high water table, a fragipan, or bedrock or by a combination of such factors as wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of moderate or severe indicate that care is needed in thinning or that the stand should not be thinned at all. Special equipment may be needed to prevent damage to shallow root systems in partial cutting operations. A plan for the periodic removal of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. Plant competition is more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants hinders adequate natural or artificial reforestation but does not

necessitate intensive site preparation and maintenance. The risk is *moderate* if competition from undesirable plants hinders natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A moderate or severe rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The *potential productivity* of *common trees* on a soil is expressed as a *site index* and as a *volume* number. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands.

The *volume* is the yield likely to be produced by the most important trees, expressed in cubic feet per acre per year calculated at the age of culmination of mean annual increment. Cubic feet can be converted to board feet by multiplying by a factor of about 5. For example, a volume of 114 means the soil can be expected to produce about 570 board feet per acre per year.

Trees to plant are those that are used for reforestation or, under suitable conditions, natural regeneration. They are suited to the soils and can produce a commercial wood crop. The desired product, topographic position (such as a low, wet area), and personal preference are three factors among many that can influence the choice of trees for use in reforestation.

Recreation

Cheatham County offers an assorted variety of recreational activities. The Cheatham Wildlife Management Area, a State-controlled game preserve, is a major attraction to hunters in the area. Traversing the center of the county is the Cumberland River, a major source of aquatic recreational activities including fishing, boating, camping, hiking, sightseeing, picnicking, and water-skiing. The Harpeth River, recognized as one of the scenic rivers in the country, meanders through the southern part of the county and is popular with canoeists (fig. 12) from all across the state. Many other forms of outdoor recreation such as golf, horseback riding, and swimming are also available in the county. Cheatham County, with its proximity to urban areas and scenic beauty, has a high potential for further recreational development.

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In the table, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in the table can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and

Figure 12.—A scenic area of the Harpeth River, which is popular with canoeists. Nolin silt loam, occasionally flooded, is on the flood plain adjacent to the river.

parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

Cheatham County has a large and varied population of wildlife and fish. The abundance and distribution of any particular species depends on the land use, the amount of water available, and the kind of vegetation. The species that prefer the more open

areas consisting of cropland, pastures, brushy fence rows, thickets, and scattered woodlots include cottontail rabbit, bobwhite quail, mourning dove, meadowlark, eastern bluebird, and groundhog. These species are most abundant where the vegetation is diverse. The species that prefer the forested ridges, hillsides, and bottom land in the county include white-tailed deer, gray and fox squirrels, wild turkey, raccoon, and a variety of nongame birds.

Shallow lakes and flooded bottom land along the Cumberland River provide breeding habitat for wood ducks and resting and feeding areas for migratory waterfowl.

The streams, lakes, and ponds in the county are inhabited by large populations of game fish including crappie, sunfish, largemouth and smallmouth bass, sauger, catfish, and white bass. Nongame species, such as shad, carp, gar, buffalo, paddlefish, snaildarter, and drum, are also abundant.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, soybeans, grain sorghum, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, orchardgrass, annual lespedeza, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, panicum, carpetgrass, switchgrass, and greenbrier.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, hawthorn, dogwood, hickory, and blackberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and eastern redcedar.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, wildrice, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special

feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 11 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

The table also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly

level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

The table gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in the table are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 12 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the

engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land

against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO 1986).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The

estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3-bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on the basis of measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, 6 to 9 percent; and *very high*, more than 9 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil

structure and permeability. Values of K range from 0.02 to 0.64. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

The table gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in the table are the depth to the seasonal high water table; the kind of water table—that is, perched, apparent, or artesian; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. A

perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, mesic Typic Fluvaquents.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Melvin series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA 1975). Unless otherwise indicated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Armour Series

The Armour series consists of very deep, well drained soils on stream terraces along the Cumberland and Harpeth Rivers. These soils formed in a mantle of old alluvium and in the underlying limestone residuum. Slopes range from 0 to 12 percent.

Armour soils are geographically associated with Arrington, Nolin, and Byler soils. The well drained

Arrington and Nolin soils are on flood plains adjacent to stream channels. Byler soils are slightly lower on the terraces and farther from drainage channels than the Armour soils. They are moderately well drained and have a fragipan in the lower part of the subsoil.

Typical pedon of Armour silt loam, 2 to 5 percent slopes, eroded, 1.0 mile south of Peagram, 1.3 miles south of the intersection of U.S. Highway 70 and Thompson Road, 1.1 miles south of the intersection of Thompson Road and Riverview Road, 0.2 mile northeast of the intersection of Riverview Road and I-40 bridge, in a pastured area. (Atlas sheet 27)

Ap—0 to 4 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

BA—4 to 12 inches; yellowish brown (10YR 5/6) silt loam; weak medium subangular blocky structure; friable; few fine roots; strongly acid; clear smooth boundary.

Bt1—12 to 45 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; few fine roots; few fine faint clay films on faces of peds; few fine pebbles; strongly acid; clear wavy boundary.

Bt2—45 to 60 inches; strong brown (7.5YR 5/6) silty clay loam; common fine distinct brownish yellow (10YR 6/6) and yellowish red (5YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine distinct clay films on faces of peds; few fine iron and manganese concretions; few fine pebbles; strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction is strongly acid or medium acid unless the surface layer has been limed. The content of gravel ranges from 0 to about 10 percent in the A and B horizons and is as much as about 35 percent in the C horizon. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. It is silt loam.

The BA horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is silt loam.

The Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. It is silty clay loam. It is mottled in shades of brown, yellow, or red.

The 2Bt and 2C horizons, if they occur, have the same colors as the Bt horizon. They are silty clay loam, silty clay, or clay.

Arrington Series

The Arrington series consists of very deep, well drained soils. These soils formed in alluvium on flood plains along the Cumberland and Harpeth Rivers. Slopes range from 0 to 8 percent.

Arrington soils are geographically associated with Beason, Wolftever, Nolin, Armour, and Byler soils. Beason soils are on low stream terraces adjacent to Arrington soils. They are fine textured in the subsoil and are somewhat poorly drained. Nolin soils are in landscape positions similar to those of the Arrington soils on flood plains or are intermingled with areas of the Arrington soils. They do not have a mollic epipedon. Armour soils are on sloping stream terraces. They do not have a mollic epipedon and are well drained. Byler soils are on gently sloping stream terraces. They are moderately well drained and have a fragipan in the subsoil.

Typical pedon of Arrington silt loam, 0 to 2 percent slopes, occasionally flooded, 2.0 miles west of Neptune, 1.4 miles west of the intersection of Neptune Road and Old Ferry Road, 0.8 mile southwest of the intersection of Neptune Road and a farm path, 200 feet northeast of the farm path and the Cumberland River in a field. (Atlas sheet 7)

Ap—0 to 7 inches; dark brown (10YR 3/3) silt loam; weak medium granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

A—7 to 16 inches; dark brown (10YR 3/3) silt loam; weak fine subangular blocky structure; friable; many fine roots; slightly acid; clear smooth boundary.

Bw1—16 to 52 inches; dark brown (10YR 3/3) silty clay loam; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; slightly acid; clear wavy boundary.

Bw2—52 to 60 inches; brown (10YR 4/3) silty clay loam; weak medium subangular blocky structure; friable; common fine roots; neutral.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction ranges from slightly acid to mildly alkaline. The depth to bedrock is more than 5 feet.

The Ap or A horizon has hue of 10YR, value of 3, and chroma of 2 or 3. It is silt loam.

The Bw horizon has hue of 10YR or 7.5YR and value and chroma of 3 or 4. It is silty clay loam or silt loam.

The C horizon, if it occurs, has hue of 10YR, value

of 4 or 5, and chroma of 2 to 4. It is silt loam, loam, or silty clay loam.

Beason Series

The Beason series consists of very deep, somewhat poorly drained soils on nearly level stream terraces along the Cumberland River. These soils formed in fine textured alluvium. Slopes range from 0 to 3 percent.

Beason soils are geographically associated with Wolftever, Melvin, Arrington, Byler, and Newark soils. Wolftever soils are in the slightly higher positions on stream terraces and adjacent to deeply cut stream channels. They are moderately well drained. Melvin soils are in the lower positions on flood plains adjacent to steep upland side slopes. They are poorly drained. Arrington soils are adjacent to river channels. They have a mollic epipedon and are well drained. Byler soils are on gently sloping stream terraces slightly above the Beason soils. They have a fragipan in the subsoil and are moderately well drained. Newark soils are on flood plains. They are fine-silty.

Typical pedon of Beason silty clay loam, occasionally flooded, 2.3 miles west of the Cheatham County Courthouse in Ashland City, 1.4 miles northwest of the intersection of Tennessee Highway 49 and Tennessee Highway 249, about 0.2 mile northwest of the intersection of Tennessee Highway 49 and Bluff Creek Recreation Area, 100 feet west of a farm path, in a pastured area. (Atlas sheet 15)

Ap—0 to 6 inches; brown (10YR 5/3) silty clay loam; moderate medium granular structure; friable; common fine roots; medium acid; clear smooth boundary.

Bt1—6 to 13 inches; yellowish brown (10YR 5/4) silty clay loam; few fine faint brown and few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few faint clay films on faces of peds and in root channels; common fine roots; medium acid; clear smooth boundary.

Bt2—13 to 23 inches; yellowish brown (10YR 5/4) silty clay; common prominent light brownish gray (2.5Y 6/2) mottles; moderate medium subangular blocky structure; firm; few fine roots; common prominent clay films on faces of peds; strongly acid; clear smooth boundary.

Bt3—23 to 42 inches; mottled yellowish brown (10YR 5/4), grayish brown (10YR 5/2), and strong brown (7.5YR 5/8) silty clay; moderate medium subangular blocky structure; firm; few fine roots; common prominent clay films on faces of peds; common iron and manganese stains and concretions; strongly acid; clear wavy boundary.

Bt4—42 to 53 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct light brownish gray (10YR 6/2) and common fine prominent strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; firm; common distinct clay films on faces of peds; few fine iron and manganese concretions; strongly acid; gradual wavy boundary.

BC—53 to 60 inches; mottled light brownish gray (10YR 6/2), strong brown (7.5YR 5/6), and yellowish brown (10YR 5/4) silty clay loam that has pockets of silty clay; weak coarse subangular blocky structure; friable; strongly acid.

The thickness of the solum ranges from 40 to 70 inches. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. The depth to bedrock is more than 5 feet.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 3 or 4. It is silty clay loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 5, and chroma of 3 to 6. It is mottled in shades of brown, yellow, or gray. In some pedons it does not have a dominant color but is evenly mottled. It is silty clay loam, silty clay, or clay.

The BC horizon and C horizon, if it occurs, have hue of 10YR, value of 5 or 6, and chroma of 2 to 4. They are mottled in shades of brown, yellow, or gray. They are silty clay loam or clay loam.

Byler Series

The Byler series consists of very deep, moderately well drained soils on stream terraces. These soils formed in old alluvium and in the underlying material weathered from limestone and siltstone. They have a compact and brittle fragipan in the subsoil. Slopes range from 2 to 12 percent.

Byler soils are geographically associated with Arrington, Nolin, Armour, and Tarklin soils. Arrington and Nolin soils are on flood plains adjacent to stream channels. They are well drained. Armour soils are in the slightly higher positions on terraces. They are well drained. Tarklin soils are on stream terraces in landscape positions similar to those of the Byler soils. They are moderately well drained, and the content of fragments in their solum ranges from 15 to 35 percent.

Typical pedon of Byler silt loam, 2 to 5 percent slopes, eroded, 1.2 miles southeast of exit 188 on I-40, 0.6 mile east of the intersection of CC Road and South Harpeth Road, 100 feet northeast of South Harpeth Road, in a pastured area. (Atlas sheet 29)

Ap—0 to 9 inches; yellowish brown (10YR 5/4) silt loam; weak medium granular structure; very friable; many fine roots; medium acid; clear smooth boundary.
Bt1—9 to 18 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; common fine roots; few fine faint clay films on faces of peds; strongly acid; clear wavy boundary.
Bt2—18 to 24 inches; yellowish brown (10YR 5/6) silty clay loam; few fine distinct pale brown (10YR 6/3) and few fine distinct light yellowish brown (10YR 6/4) mottles; moderate medium subangular blocky structure; friable; common fine roots; few fine faint clay films on faces of peds; strongly acid; clear smooth boundary.
Btx—24 to 44 inches; mottled yellowish brown (10YR 5/6), light gray (10YR 7/2), strong brown (7.5YR 5/6), and light brownish gray (2.5Y 6/2) silty clay loam; moderate coarse and very coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle in 60 to 80 percent of the mass; few fine roots following vertical seams; vertical seams 1/2 inch to 2 inches in diameter, 4 to 8 inches apart coated with gray silt and clay; few fine iron and manganese stains and concretions; strongly acid; gradual wavy boundary.
2Bt—44 to 60 inches; mottled strong brown (7.5YR 5/6), gray (10YR 5/1), and light gray (10YR 7/1) silty clay loam; weak and moderate medium subangular blocky structure; friable; common prominent clay films on faces of peds; strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or medium acid. The depth to bedrock is more than 5 feet. The content of gravel ranges from 0 to 5 percent in the A and B horizons, from 0 to 20 percent in the Btx horizon, and from 0 to 35 percent in the 2Bt horizon. Depth to the fragipan ranges from 18 to 30 inches.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam.

The BA horizon, if present, has hue of 10YR, value of 4 or 5, and chroma of 4 to 6. It is silt loam.

The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5, and chroma of 4 to 6. It is mottled in shades of yellow, brown, or gray. It is silt loam or silty clay loam.

The Btx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 6. It is mottled in shades of yellow, brown, or gray. In some pedons it does not have a dominant color but is evenly mottled. It is silty clay loam, silt loam, gravelly silty clay loam, or gravelly silt loam.

The 2Bt horizon has colors like those in the Btx horizon. It is silty clay loam, silty clay, or gravelly silty clay.

Dickson Series

The Dickson series consists of very deep, moderately well drained soils on uplands. These soils formed in loess and in the underlying limestone residuum. They have a fragipan in the subsoil. Slopes range from 2 to 5 percent.

Dickson soils are geographically associated with Sengtown, Mountview, Taft, and Guthrie soils. Sengtown soils are on strongly sloping to steep hillsides. They are fine textured in the subsoil and are well drained. Mountview soils are in the slightly higher positions on ridgetops and on gently sloping hillsides. They do not have a fragipan and are well drained. Taft soils are on upland flats and at the head of drainageways. They are somewhat poorly drained. Guthrie soils are in concave depressions and in old drainage channels. They are poorly drained.

Typical pedon of Dickson silt loam, 2 to 5 percent slopes, eroded, 2.8 miles northwest of Thomasville, 0.5 mile west of the intersection of Thomasville Road and Buster Shearon Road, 0.3 mile east of the intersection of Buster Shearon Road and Fendrix Shearon Road, 25 feet north of the road in a field. (Atlas sheet 1)

Ap—0 to 9 inches; dark yellowish brown (10YR 4/4) silt loam; weak fine granular structure; very friable; common fine roots; few fine iron and manganese concretions; medium acid; clear smooth boundary.
Bt1—9 to 16 inches; yellowish brown (10YR 5/6) silt loam; moderate medium subangular blocky structure; friable; few fine roots; few fine faint clay films on faces of peds; few fine iron and manganese concretions and nodules; strongly acid; clear smooth boundary.
Bt2—16 to 20 inches; yellowish brown (10YR 5/6) silt loam; common fine distinct strong brown (7.5YR 4/6) and common fine prominent very pale brown (10YR 7/3) mottles; moderate medium subangular blocky structure; friable; few fine faint clay films on faces of peds; common fine iron and manganese stains and concretions; very strongly acid; clear wavy boundary.
Ex—20 to 25 inches; pale brown (10YR 6/3) silt loam; common medium distinct light gray (10YR 7/2) and brownish yellow (10YR 6/6) and common medium prominent strong brown (7.5YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm;

common fine iron and manganese stains and concretions; very strongly acid; clear wavy boundary.

Btx1—25 to 39 inches; mottled dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/8), light gray (10YR 7/1), and gray (10YR 5/1) silty clay loam; weak very coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle; common fine prominent films of silt and clay on faces of prisms and in vertical seams; few fine iron and manganese concretions; very strongly acid; gradual wavy boundary.

Btx2—39 to 49 inches; mottled strong brown (7.5YR 5/8), red (2.5YR 4/8), gray (10YR 5/1), and light brownish gray (10YR 6/2) silty clay loam; moderate very coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle; common fine prominent clay films on faces of prisms and in vertical seams; few fine iron and manganese concretions; very strongly acid; gradual wavy boundary.

2Bt1—49 to 57 inches; strong brown (7.5YR 5/8) silty clay; common coarse prominent red (10R 4/8), light gray (10YR 7/2), and grayish brown (10YR 5/2) mottles; moderate medium subangular blocky structure; firm; common medium prominent clay films on faces of peds; very strongly acid; gradual wavy boundary.

2Bt2—57 to 72 inches; red (2.5YR 4/8) silty clay; common medium prominent grayish brown (10YR 5/2) and few fine prominent strong brown (7.5YR 5/8) mottles; massive; firm; very strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. Depth to the fragipan ranges from 18 to 30 inches. The content of gravel ranges from 0 to 10 percent in the lower part of the Btx horizon and from 0 to 35 percent in the 2Bt horizon. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam.

The Bt horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 4 to 6. It is mottled in shades of yellow, brown, or gray. It is silt loam or silty clay loam.

The Ex horizon has hue of 10YR, value of 5 to 7, and chroma of 2 or 3. It is silt loam.

The Btx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 to 6. It is mottled in shades of yellow, brown, or gray. In many pedons it does not have a dominant color but is evenly mottled. It is silt loam or silty clay loam.

The 2Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 3 to 5, and chroma of 6 to 8. It is mottled in shades of brown, red, or gray. The texture of the fine-earth fraction is silty clay loam, clay, or silty clay.

Ennis Series

The Ennis series consists of very deep, well drained soils that formed in gravelly alluvium on narrow flood plains. Slopes range from 0 to 3 percent.

Ennis soils are geographically associated with Lindside, Nolin, Humphreys, Hawthorne, and Sulphura soils. Lindside soils are intermingled with areas of the Ennis soils on narrow flood plains. They are moderately well drained and have a lower content of chert in the solum than the Ennis soils. Nolin soils are on the wider flood plains. They are well drained, and the content of rock fragments in their solum is less than 15 percent. The well drained Humphreys soils are on gently sloping colluvial foot slopes. Hawthorne and Sulphura soils are on adjacent, steep side slopes. They are somewhat excessively drained, and the content of rock fragments in their solum is more than 35 percent.

Typical pedon of Ennis gravelly silt loam, occasionally flooded, 4.2 miles west of Pleasant View, 1.1 miles southwest of the intersection of Bethel Road and Old Clarksville Pike, 0.6 mile southeast of the intersection of Old Clarksville Pike and Tula Page Road, 200 feet northeast of Tula Page Road and Raccoon Creek. (Atlas sheet 4)

Ap—0 to 7 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; common fine and medium roots; about 20 percent, by volume, angular chert fragments 1/2 inch to 3 inches in diameter; slightly acid; clear wavy boundary.

Bw—7 to 30 inches; dark yellowish brown (10YR 4/4) gravelly silt loam; weak fine subangular blocky structure; friable; common fine and medium roots; about 30 percent, by volume, angular chert fragments 1/2 inch to 3 inches in diameter; medium acid; gradual wavy boundary.

Ab—30 to 40 inches; very dark grayish brown (10YR 3/2) very gravelly silt loam; weak fine subangular blocky structure; friable; about 35 percent angular chert fragments 1/2 inch to 5 inches in diameter; medium acid; gradual wavy boundary.

C—40 to 60 inches; dark brown (10YR 4/3) very gravelly silty clay loam; weak medium granular structure; about 55 percent, by volume, angular chert fragments 1/2 inch to 5 inches in diameter; friable; medium acid.

The thickness of the solum ranges from 25 to 60 inches. Reaction ranges from very strongly acid to

medium acid unless the surface layer has been limed. The content of gravel and cobbles ranges from 15 to 35 percent in the solum and up to 55 percent in the C horizon. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 6. It is gravelly silt loam or gravelly loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is gravelly silt loam or gravelly loam.

The Ab horizon, if it occurs, has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is gravelly silt loam or gravelly silty clay loam.

The C horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is very gravelly silt loam or very gravelly silty clay loam.

Etowah Series

The Etowah series consists of very deep, well drained soils on stream terraces and foot slopes. These soils formed in old alluvium and colluvium, except for the lower part of some pedons formed in limestone residuum. Slopes range from 2 to 12 percent.

Etowah soils are geographically associated with Sengtown, Minvale, Nolin, and Lindside soils. Sengtown soils are on adjacent, steep side slopes. They are fine textured in the subsoil and are well drained. Minvale soils are in landscape positions similar to those of the Etowah soils. They are well drained, and the content of fragments in their solum ranges from 15 to 35 percent. Nolin and Lindside soils are on adjacent flood plains. Nolin soils are well drained. Lindside soils are moderately well drained.

Typical pedon of Etowah silt loam, 2 to 5 percent slopes, eroded, 4.5 miles southwest of Henrietta, 1.7 miles northwest of the intersection of Buck Hollow Road and Tennessee Highway 12, about 1.2 miles west of the intersection of Sanders Road and Tennessee Highway 12, about 700 feet east of Happy Hills Boys Ranch road, in a pastured area. (Atlas sheet 7)

Ap—0 to 5 inches; dark yellowish brown (10YR 3/4) silt loam; weak medium granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

Bt1—5 to 20 inches; strong brown (7.5YR 5/6) silty clay loam; common medium prominent dark brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few fine faint clay films on faces of peds; few fine iron and manganese stains; medium acid; clear smooth boundary.

Bt2—20 to 34 inches; strong brown (7.5YR 5/6) silty clay loam; few fine distinct dark brown (7.5YR 4/4) mottles; moderate medium subangular blocky structure; friable; few fine roots; common fine distinct clay films on faces of peds; few fine iron and manganese stains; strongly acid; clear wavy boundary.

Bt3—34 to 55 inches; yellowish red (5YR 5/6) silty clay loam; moderate medium subangular blocky structure; friable; common fine distinct clay films on faces of peds; common fine iron and manganese concretions; few fine and medium angular fragments of chert; strongly acid; clear wavy boundary.

Bt4—55 to 60 inches; yellowish red (5YR 5/6) silty clay loam; common fine distinct reddish yellow (7.5YR 6/6) mottles; moderate medium subangular blocky structure; friable; few medium prominent clay films on faces of peds; common fine iron and manganese stains and concretions; few fine and medium angular fragments of chert; strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. The content of gravel is less than 5 percent except for in the A horizon where it ranges from 0 to 15 percent. The depth to bedrock is more than 6 feet.

The Ap horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 to 4. It is silt loam.

The Bt horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 4 or 5, and chroma of 4 to 8. It is silty clay loam in the upper part and silty clay loam or silty clay in the lower part.

The 2Bt horizon, if it occurs, has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6 to 8. It is silty clay loam or clay.

Guthrie Series

The Guthrie series consists of very deep, poorly drained soils that formed in silty material on upland flats and in depressions. These soils have a fragipan in the subsoil. Slopes range from 0 to 2 percent.

Guthrie soils are geographically associated with Dickson, Taft, and Lindside soils. Dickson soils are in the higher positions on the landscape. They are moderately well drained. Taft soils are intermingled with areas of the Guthrie soils or are in landscape positions similar to those of the Guthrie soils. They are somewhat poorly drained. Lindside soils are on adjacent flood plains. They are moderately well drained.

Typical pedon of Guthrie silt loam, occasionally flooded, 2.1 miles southwest of Pleasant View,

0.7 mile northwest of the intersection of Tennessee Highway 49 and Old Clarksville Pike, 0.1 mile southeast of the intersection of Old Sweet Home Road and Old Clarksville Pike, 400 feet southwest of Old Clarksville Pike, in a wooded area. (Atlas sheet 8)

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; common fine prominent light brownish gray (2.5Y 6/2) mottles; weak medium granular structure; very friable; common fine and medium roots; few wormcasts; common iron and manganese stains and nodules; medium acid; clear smooth boundary.

E—7 to 17 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent yellowish red (5YR 4/6) and common medium distinct light brownish gray (10YR 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; common iron and manganese stains and nodules; strongly acid; clear smooth boundary.

Bg1—17 to 25 inches; grayish brown (10YR 5/2) silt loam; few fine prominent yellowish red (5YR 4/6) and few fine distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; few fine roots; common iron and manganese stains and nodules; strongly acid; gradual wavy boundary.

Bg2—25 to 40 inches; grayish brown (10YR 5/2) silt loam; few fine distinct yellowish brown (10YR 5/6) and common medium distinct light brownish gray (2.5Y 6/2) mottles; weak medium subangular blocky structure; friable; common iron and manganese stains; very strongly acid; gradual wavy boundary.

Btx1—40 to 52 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure; firm; few fine prominent films of silt and clay on faces of prisms and in vertical seams; few iron and manganese stains; very strongly acid; gradual wavy boundary.

Btx2—52 to 62 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak very coarse prismatic structure; firm; few fine prominent films of silt and clay on prism faces and in vertical seams; common iron and manganese stains and concretions; very strongly acid.

The solum is more than 60 inches thick. Reaction ranges from extremely acid to strongly acid unless the surface layer has been limed. Depth to the fragipan ranges from 20 to 40 inches. The depth to bedrock is more than 5 feet.

The Ap or A horizon has hue of 10YR, value of 3 or 4, and chroma of 2 or 3. It is silt loam.

The E horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 2 to 4. It is silt loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 5 to 7, and chroma of 1 or 2. It is silt loam.

The Btx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 1 or 2. It has few to common mottles in shades of yellow and brown. In some pedons it does not have a dominant color but is evenly mottled. It is silt loam or silty clay loam.

Hawthorne Series

The Hawthorne series consists of moderately deep, somewhat excessively drained, gravelly soils on highly dissected uplands. These soils formed in loamy material weathered from siltstone and limestone. Slopes range from 5 to 60 percent.

Hawthorne soils are geographically associated with Sengtown and Sulphura soils. Sengtown soils are intermingled with areas of the Hawthorne soils on narrow, sloping ridgetops and on the upper part of the steeper side slopes. They are well drained and have a solum that is more than 60 inches thick. The content of rock fragments in their control section is less than 35 percent. Sulphura soils are on steep side slopes below the Hawthorne soils. They are somewhat excessively drained and have hard bedrock within a depth of 40 inches.

Typical pedon of Hawthorne gravelly silt loam, 5 to 12 percent slopes, 10.6 miles southwest of Ashland City, 7.2 miles southwest of the intersection of Tennessee Highway 49 and Tennessee Highway 250, about 3.4 miles northwest of the intersection of Primm Road and Tennessee Highway 250, about 15 feet north of Primm Road, in a wooded area. (Atlas sheet 14)

A—0 to 3 inches; brown (10YR 5/3) gravelly silt loam; weak medium granular structure; very friable; common fine and medium roots; 20 percent chert and siltstone fragments 1/2 inch to 5 inches in diameter; strongly acid; clear smooth boundary.

E—3 to 6 inches; light yellowish brown (10YR 6/4) gravelly silt loam; few fine distinct brown (10YR 5/3) mottles; weak medium granular structure; very friable; common fine and medium roots; 25 percent chert and siltstone fragments 1/2 inch to 5 inches in diameter; very strongly acid; clear smooth boundary.

Bw1—6 to 14 inches; strong brown (7.5YR 5/6) very gravelly silt loam; common medium distinct light yellowish brown (10YR 6/4) mottles; moderate

medium subangular blocky structure; friable; few medium and coarse roots matted around stones; 45 percent chert and siltstone fragments 1/2 inch to 5 inches in diameter; very strongly acid; clear wavy boundary.

Bw2—14 to 33 inches; variegated strong brown (7.5YR 5/6), yellowish brown (10YR 5/6), light yellowish brown (10YR 6/4), and very pale brown (10YR 7/4) very channery silt loam interlayered with highly fractured siltstone; weak fine and medium platy structure; friable; few medium roots between fragments; 60 percent fragments of siltstone and angular chert 1 to 5 inches in diameter; very strongly acid; clear wavy boundary.

Cr—33 to 60 inches; alternating strata of highly fractured siltstone and highly weathered silty clay loam saprolite.

The thickness of the solum and depth to the paralithic contact range from 20 to 40 inches. Reaction ranges from strongly acid to extremely acid. The content of fragments ranges from 10 to 35 percent in the A and E horizons and from 35 to 60 percent in the B and C horizons. The depth to hard bedrock is more than 5 feet.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is gravelly silt loam.

The E horizon has hue of 10YR, value of 5 or 6, and chroma of 3 or 4. It is gravelly silt loam.

The Bw horizon and the Bt horizon, if it occurs, have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth fraction is silt loam or silty clay loam.

The C horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. The texture of the fine-earth fraction is silt loam or silty clay loam.

The Cr horizon is highly fractured, horizontally bedded siltstone and silty clay loam saprolite.

Humphreys Series

The Humphreys series consists of very deep, well drained soils that formed in loamy colluvium and alluvium on foot slopes and stream terraces. Slopes range from 2 to 12 percent.

Humphreys soils are geographically associated with Ennis, Nolin, Minvale, Hawthorne, and Sulphura soils. Ennis soils are on narrow flood plains slightly below the Humphreys soils. Nolin soils are on wider flood plains. The content of rock fragments in their solum is less than 15 percent. Minvale soils are on foot slopes in landscape positions similar to those of the Humphreys soils. They have redder colors in their profile and a deeper solum than the Humphreys soils. Ennis, Nolin, and Minvale soils are well drained. Hawthorne and Sulphura soils are on steep side slopes. They are somewhat excessively drained and are moderately deep. The content of rock fragments in their solum is more than 35 percent.

Typical pedon of Humphreys gravelly silt loam, 5 to 12 percent slopes, 3.4 miles southeast of Ashland City, 0.3 mile northeast of the intersection of Tennessee Highway 12 and Little Marrowbone Road, 0.9 mile west of the intersection of Little Marrowbone Road and Big Marrowbone Road, 30 feet north of Little Marrowbone Road, in a pastured area. (Atlas sheet 18)

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly silt loam; weak fine granular structure; very friable; common fine and medium roots; 15 percent angular fragments of chert and siltstone; slightly acid; clear smooth boundary.

Bt1—8 to 14 inches; dark yellowish brown (10YR 4/6) gravelly silt loam; weak medium subangular blocky structure; friable; few fine roots; few fine faint clay films on faces of peds and on fragments; 35 percent angular fragments of chert and siltstone; medium acid; clear smooth boundary.

Bt2—14 to 36 inches; yellowish brown (10YR 5/6) gravelly silty clay loam; common medium distinct brown (10YR 5/3) mottles; moderate medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds and on fragments; 25 percent angular fragments of chert and siltstone; strongly acid; clear smooth boundary.

Bt3—36 to 51 inches; yellowish brown (10YR 5/6) gravelly silty clay loam; few fine faint brownish yellow mottles; weak fine subangular blocky structure; friable; few fine faint clay films on faces of peds and on fragments; 30 percent angular fragments of chert and siltstone; strongly acid; gradual wavy boundary.

BC—51 to 60 inches; yellowish brown (10YR 5/6) gravelly silty clay loam; weak fine subangular blocky structure; friable; 35 percent angular fragments of chert and siltstone; strongly acid.

The thickness of the solum ranges from 30 to 60 inches. Reaction ranges from very strongly acid to medium acid unless the surface layer has been limed. The content of chert and siltstone fragments ranges from 15 to 35 percent throughout the profile. The depth to bedrock is more than 5 feet.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 3, and chroma of 2 to 4. It is gravelly silt loam or gravelly loam.

The Bt horizon has hue of 10YR or 7.5YR, value of

4 or 5, and chroma of 4 to 6. It is gravelly silt loam or gravelly silty clay loam.

The BC horizon, if it occurs, has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. It is gravelly silt loam or gravelly silty clay loam.

Lindside Series

The Lindside series consists of very deep, moderately well drained soils that formed in alluvium on flood plains. Slopes range from 0 to 3 percent.

Lindside soils are geographically associated with Nolin, Arrington, Ennis, Sengtown, and Byler soils. Nolin and Arrington soils are on flood plains adjacent to stream channels. They are well drained. Ennis soils are on narrow tributary streams. They are well drained, and the content of gravel in their solum ranges from 15 to 35 percent. Sengtown soils are on the side slopes of sinkholes. They are well drained and are fine textured in the subsoil. Byler soils are on gently sloping stream terraces. They are moderately well drained and have a dense fragipan in the lower part of the subsoil.

Typical pedon of Lindside silt loam, occasionally flooded, 4.4 miles northeast of Ashland City, 1.2 miles southwest of the intersection of Old Clarksville Pike and George Boyd Road, 0.3 mile northwest of the intersection of Blue Springs Creek and George Boyd Road, 200 feet west of George Boyd Road in a field. (Atlas sheet 12)

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; neutral; clear smooth boundary.

Bw1—6 to 11 inches; yellowish brown (10YR 5/4) silt loam; weak medium subangular blocky structure; few fine roots; slightly acid; clear smooth boundary.

Bw2—11 to 20 inches; yellowish brown (10YR 5/4) silt loam; many medium faint brown (10YR 5/3) and few fine faint pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; few fine roots; slightly acid; clear smooth boundary.

Bw3—20 to 36 inches; brown (10YR 5/3) silt loam; common coarse distinct light brownish gray (2.5Y 6/2), few fine faint pale brown (10YR 6/3), and few fine distinct dark brown (10YR 3/3) mottles; weak medium subangular blocky structure; friable; medium acid; gradual wavy boundary.

BC—36 to 42 inches; light brownish gray (2.5Y 6/2) silt loam; common fine prominent strong brown (7.5YR 4/6) mottles; weak medium subangular blocky structure; friable; common iron and manganese stains and concretions; medium acid; gradual wavy boundary.

Cg1—42 to 52 inches; grayish brown (10YR 5/2) silt loam; common fine prominent strong brown (7.5YR 4/6) and yellowish red (5YR 4/6) mottles; massive; friable; common iron and manganese stains and concretions; medium acid; gradual wavy boundary.

Cg2—52 to 60 inches; gray (10YR 5/1) silt loam; massive; friable; neutral.

The thickness of the solum ranges from 25 to 50 inches. Reaction ranges from strongly acid to mildly alkaline in the upper part and from medium acid to mildly alkaline in the lower part. The content of gravel ranges from 0 to 5 percent throughout the profile. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR or 7.5YR, value of 3 to 5, and chroma of 2 or 3. It has value of 6 or more when it is dry. It is silt loam.

The Bw horizon has hue of 10YR, 7.5YR, or 2.5Y, value of 4 or 5, and chroma of 3 to 6. It is mottled in shades of gray, yellow, or brown. It is silt loam.

The BC and C horizons have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 3. It is silt loam or silty clay loam.

Melvin Series

The Melvin series consists of very deep, poorly drained soils that formed in alluvium on flood plains along the Cumberland and Harpeth Rivers. Slopes range from 0 to 2 percent.

Melvin soils are geographically associated with Newark, Arrington, Beason, and Byler soils. Newark soils are in the slightly higher positions on flood plains. They are somewhat poorly drained. Arrington soils are adjacent to stream channels. They are well drained. Beason soils are on low stream terraces. They are somewhat poorly drained and are fine textured in the subsoil. Byler soils are on gently sloping stream terraces. They are moderately well drained and have a dense fragipan in the lower part of the subsoil.

Typical pedon of Melvin silt loam, frequently flooded, 2.1 miles northwest of Ashland City, 1.0 mile southwest of the intersection of Tennessee Highway 12 and Chapmansboro Road, 2.7 miles southeast of the intersection of Sycamore Creek bridge and Chapmansboro Road, 0.3 mile north of Chapmansboro Road and a farm path, in a field. (Atlas sheet 15)

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; common fine prominent reddish brown (5YR 4/4) and common fine distinct grayish brown (2.5Y 5/2) mottles; weak fine granular structure; very friable;

few fine and medium roots; medium acid; clear smooth boundary.
A—7 to 10 inches; brown (10YR 4/3) silt loam; common fine prominent reddish brown (5YR 4/4) and common medium distinct grayish brown (2.5Y 5/2) mottles; weak medium subangular blocky structure; friable; few fine roots; medium acid; clear smooth boundary.
Bg—10 to 20 inches; light brownish gray (10YR 6/2) silt loam; common fine prominent strong brown (7.5YR 5/8) and few fine prominent reddish brown (5YR 4/4) mottles; moderate medium subangular blocky structure; friable; common iron and manganese stains and concretions; medium acid; clear wavy boundary.
Cg1—20 to 42 inches; light brownish gray (10YR 6/2) silt loam; common medium prominent strong brown (7.5YR 5/8), few fine prominent reddish brown (5YR 4/4), and common medium distinct grayish brown (2.5Y 5/2) mottles; massive; friable; common iron and manganese stains and concretions; medium acid; clear wavy boundary.
Cg2—42 to 60 inches; gray (5Y 6/1) silty clay loam; common coarse prominent strong brown (7.5YR 5/8), few fine prominent reddish brown (5YR 4/4), and common fine prominent light brownish gray (10YR 6/2) mottles; massive; firm; common iron and manganese stains and concretions; medium acid.

The thickness of the solum ranges from 20 to 40 inches. Reaction ranges from medium acid to mildly alkaline. The content of gravel ranges from 0 to 5 percent throughout the profile. The depth to bedrock is more than 5 feet.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 1 to 4. It is silt loam.

The Bg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 2 or less. It is mottled in shades of red, brown, or gray. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7, and chroma of 2 or less. It is mottled in shades of red, brown, or gray. It is silt loam, silty clay loam, or loam. In some pedons it is stratified below a depth of 40 inches.

Minvale Series

The Minvale series consists of very deep, well drained soils that formed in cherty colluvium on foot slopes. Slopes range from 5 to 20 percent.

Minvale soils are geographically associated with Sengtown, Hawthorne, Sulphura, Byler, and Tarklin soils. Sengtown soils are on steep side slopes above the Minvale soils. They are fine textured in the subsoil. Hawthorne and Sulphura soils are above the Minvale soils on steep side slopes. They are moderately deep to bedrock. Byler and Tarklin soils are on sloping stream terraces. They are moderately well drained and have a dense fragipan in the subsoil.

Typical pedon of Minvale gravelly silt loam, 12 to 20 percent slopes, eroded, 2.0 miles east of Ashland City, 1.3 miles northeast of the intersection of Tennessee Highway 12 and Dry Fork Creek Road, 1.7 miles southwest of the intersection of Dry Fork Creek Road and Valley View Road, 10 feet north of Dry Fork Creek Road. (Atlas sheet 15)

A—0 to 8 inches; brown (10YR 4/3) gravelly silt loam; weak fine granular structure; very friable; many fine and medium roots; 20 percent fragments of chert and siltstone; medium acid; clear smooth boundary.
BE—8 to 18 inches; brown (7.5YR 5/4) gravelly silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium subangular blocky structure; friable; common fine and few coarse roots; few fine faint clay films on faces of peds; 25 percent fragments of chert and siltstone; strongly acid; clear smooth boundary.
Bt1—18 to 38 inches; yellowish red (5YR 5/6) gravelly silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; few distinct clay films on faces of peds; 25 percent fragments of chert and siltstone; strongly acid; gradual smooth boundary.
Bt2—38 to 60 inches; yellowish red (5YR 4/6) gravelly silty clay loam; few fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; friable; few fine roots; common distinct clay films on faces of peds; 25 percent fragments of chert and siltstone; strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. The content of chert fragments ranges from 15 to 35 percent in each horizon. The depth to bedrock is more than 5 feet.

The A or Ap horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is gravelly silt loam.

The BE horizon has hue of 10YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. It is gravelly silt loam.

The Bt horizon has hue of 10YR to 2.5YR, value of 4 or 5, and chroma of 4 to 8. It is gravelly silty clay loam in the upper part and ranges from gravelly silty clay loam to gravelly silty clay in the lower part.

Mountview Series

The Mountview series consists of very deep, well drained soils on uplands. These soils formed in a thin mantle of loess and in the underlying limestone residuum. Slopes range from 2 to 12 percent.

Mountview soils are geographically associated with Dickson, Sengtown, and Hawthorne soils. Dickson soils are in the slightly lower positions on uplands. They are moderately well drained and have a fragipan in the lower part of the subsoil. Sengtown soils are on the steeper side slopes below the Mountview soils. They are fine textured in the subsoil, and the content of fragments ranges from 15 to 35 percent throughout their profile. Hawthorne soils are on steep side slopes and sloping ridges below the Mountview soils. They are underlain by soft bedrock at a depth of 20 to 40 inches, and the content of fragments in their solum is more than 35 percent.

Typical pedon of Mountview silt loam, 5 to 12 percent slopes, eroded, 1.7 miles northeast of Cheap Hill, 0.7 mile northwest of the intersection of Sweet Home Road and Shearon Road, 1.8 miles southwest of the intersection of Thomasville Road and Shearon Road, 50 feet east of Shearon Road, in an area of idle land. (Atlas sheet 7)

Ap—0 to 6 inches; yellowish brown (10YR 5/4) silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium granular structure; very friable; common fine roots; strongly acid; clear smooth boundary.

Bt1—6 to 13 inches; strong brown (7.5YR 5/6) silty clay loam; few fine distinct yellowish brown (10YR 5/6) mottles; moderate medium subangular blocky structure; friable; common fine roots; few faint clay films on faces of peds; strongly acid; clear smooth boundary.

Bt2—13 to 23 inches; strong brown (7.5YR 5/6) silty clay loam; moderate medium subangular blocky structure; few fine roots; few distinct clay films on faces of peds; few fine fragments; very strongly acid; clear wavy boundary.

2Bt3—23 to 30 inches; yellowish red (5YR 5/6) gravelly clay; common medium prominent red (2.5YR 4/8) and common fine distinct strong brown (7.5YR 5/6) mottles; moderate medium subangular blocky structure; firm; common medium prominent clay films on faces of peds; 15 percent fragments of chert; very strongly acid; clear wavy boundary.

2Bt4—30 to 60 inches; red (2.5YR 4/6) gravelly clay; common medium prominent brownish yellow (10YR 6/8), yellowish brown (10YR 5/4), and red (10R 4/8) mottles; moderate medium subangular and angular blocky structure; firm; common medium prominent clay films on faces of peds; 25 percent angular fragments of chert; very strongly acid.

The solum is more than 60 inches thick. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. The content of gravel ranges from 0 to 5 percent in the A and Bt horizons and from 5 to 35 percent in the 2Bt horizon. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4. It is silt loam.

The Bt horizon has hue of 10YR or 7.5YR, value of 5, and chroma of 6 or 8. It is silty clay loam or silt loam.

The 2Bt horizon has hue of 5YR or 2.5YR, value of 4 or 5, and chroma of 6. It has few to common mottles in shades of brown, yellow, or red. The texture of the fine-earth fraction is silty clay loam, silty clay, or clay.

Newark Series

The Newark series consists of very deep, somewhat poorly drained soils. These soils formed in alluvium on flood plains along the Cumberland and Harpeth Rivers and their major tributaries. Slopes range from 0 to 2 percent.

Newark soils are geographically associated with Beason, Wolftever, Melvin, Arrington, and Byler soils. Beason and Wolftever soils are in the slightly higher positions on low stream terraces. They are fine textured in the subsoil. Beason soils are somewhat poorly drained. Wolftever soils are moderately well drained. Melvin soils are in the slightly lower positions on flood plains adjacent to steep upland side slopes. They are poorly drained. Arrington soils are adjacent to stream and river channels. They are well drained and have a mollic epipedon. Byler soils are on gently sloping stream terraces. They are moderately well drained and have a fragipan in the lower part of the subsoil.

Typical pedon of Newark silt loam, frequently flooded, 1.6 miles northwest of the Cheatham County Courthouse in Ashland City, 900 feet southwest of the intersection of Tennessee Highway 12 and Chapmansboro Road, 75 feet north of the intersection of Chapmansboro Road and TWRA road, in a field. (Atlas sheet 15)

Ap—0 to 7 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; common fine roots; common wormcasts; slightly acid; clear smooth boundary.

Bw—7 to 16 inches; brown (10YR 5/3) silt loam;

common medium distinct light brownish gray (2.5Y 6/2) and common fine prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; friable; common iron and manganese stains and concretions; common fine roots; common wormcasts; slightly acid; clear smooth boundary.

Bg—16 to 26 inches; light brownish gray (2.5Y 6/2) silty clay loam; common fine prominent yellowish red (5YR 5/6) and common fine distinct pale brown (10YR 6/3) mottles; weak medium subangular blocky structure; friable; common iron and manganese stains and concretions; few fine roots; medium acid; gradual wavy boundary.

Cg1—26 to 43 inches; gray (10YR 6/1) silty clay loam; common medium prominent yellowish red (5YR 5/6) and few fine faint light brownish gray mottles; massive; firm; few iron and manganese stains; medium acid; gradual wavy boundary.

Cg2—43 to 60 inches; gray (N 6/0) silty clay; common fine prominent yellowish red (5YR 5/6) and few fine prominent red (2.5YR 5/8) and reddish yellow (7.5YR 7/8) mottles; massive; firm; medium acid.

The thickness of the solum ranges from 20 to 50 inches. Reaction ranges from medium acid to mildly alkaline. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam, loam, or silty clay loam.

The Bw horizon has hue of 7.5YR to 2.5Y, value of 4 or 5, and chroma of 3 or 4. It is mottled in shades of red, brown, or gray. It is silt loam or silty clay loam.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 2 or less. It is silt loam or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y or is neutral in hue. It has value of 5 to 7 and chroma of 0 to 2. It is typically silt loam or silty clay loam, but the range includes silty clay in the lower part of the horizon.

Nolin Series

The Nolin series consists of very deep, well drained soils that formed in alluvium on narrow flood plains and in the bottom of a few large sinkholes. Slopes range from 0 to 2 percent.

Nolin soils are geographically associated with Arrington, Lindside, Ennis, Byler, and Sengtown soils. Arrington soils are on flood plains in landscape positions similar to those of the Nolin soils. They are well drained and have a mollic epipedon. Lindside soils are in narrow strips adjacent to the steeper side slopes. They are moderately well drained. Ennis soils are on narrow tributary streams. They are well drained, and the content of fragments in their solum is more than 35 percent. Byler soils are on gently sloping stream terraces. They are moderately well drained and have a fragipan in the subsoil. Sengtown soils are on side slopes of sinkholes. They are well drained and are fine textured in the subsoil.

Typical pedon of Nolin silt loam, occasionally flooded, 0.8 mile west of Kingston Springs, 1.4 miles southeast of the intersection of U.S. Highway 70 and Kingston Springs Road, 0.4 mile east of the intersection of Kingston Springs Road and a farm path, 200 feet northeast of the farm path, in a pastured area. (Atlas sheet 26)

Ap—0 to 6 inches; brown (10YR 4/3) silt loam; weak fine granular structure; very friable; many fine roots; slightly acid; clear smooth boundary.

Bw1—6 to 26 inches; dark yellowish brown (10YR 4/4) silt loam; few fine faint brown (10YR 4/3) mottles; weak medium subangular blocky structure; common fine roots; medium acid; clear smooth boundary.

Bw2—26 to 60 inches; brown (7.5YR 4/4) silt loam; few fine distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; few fine roots; medium acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction ranges from medium acid to moderately alkaline. The content of gravel ranges from 0 to 5 percent throughout the profile. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 or 3. It is silt loam or loam.

The Bw horizon has hue of 10YR, 2.5Y, or 7.5YR, value of 4 or 5, and chroma of 3 or 4. In some pedons it is mottled in shades of brown or gray below a depth of 24 inches. It is silt loam or silty clay loam. Some pedons have buried A and B horizons below a depth of 20 inches.

The C horizon, if it occurs, has hue of 10YR, 2.5Y, or 7.5YR, value of 4 or 5, and chroma of 2 to 4. It is silt loam, silty clay loam, or loam.

Sengtown Series

The Sengtown series consists of very deep, well drained soils on gently sloping to very steep uplands. These soils formed in clayey material weathered from cherty limestone. Slopes range from 2 to 60 percent.

Sengtown soils are geographically associated with Hawthorne, Dickson, and Mountview soils. Hawthorne soils are on very steep side slopes and on narrow sloping ridges below the Sengtown soils. They are

somewhat excessively drained, and the content of fragments in their solum is more than 35 percent. Dickson soils are on gently sloping ridges. They are moderately well drained and have a dense fragipan in the lower part of the subsoil. Mountview soils are on ridgetops and side slopes at slightly higher elevations than the Sengtown soils. They have as much as 2 feet of silty material over fine textured residuum.

Typical pedon of Sengtown gravelly silt loam, 12 to 20 percent slopes, eroded, 6.1 miles northwest of Ashland City, 0.4 mile southeast of the intersection of Tennessee Highway 12 and Chapmansboro Road, 25 feet east of a road, in a pastured area. (Atlas sheet 11)

Ap—0 to 5 inches; brown (10YR 4/3) gravelly silt loam; weak medium granular structure; very friable; many fine roots; 20 percent angular fragments of chert; slightly acid; clear smooth boundary.

Bt1—5 to 15 inches; yellowish red (5YR 4/6) gravelly silty clay loam; common medium distinct red (2.5YR 4/6) mottles; moderate fine subangular blocky structure; friable; many fine roots; few fine prominent clay films on faces of peds; 35 percent angular fragments of chert; medium acid; clear smooth boundary.

Bt2—15 to 58 inches; red (2.5YR 4/6) gravelly clay; few fine prominent yellowish brown (10YR 5/8) mottles; moderate medium angular and subangular blocky structure; firm; common fine roots; many medium prominent clay films on faces of peds; 25 percent angular fragments of chert; strongly acid; gradual wavy boundary.

Bt3—58 to 68 inches; red (2.5YR 4/6) gravelly clay; common fine prominent yellowish brown (10YR 5/8) mottles; moderate medium angular and subangular blocky structure; firm; many medium prominent clay films on faces of peds; 30 percent angular fragments of chert; strongly acid.

The solum is more than 60 inches thick. Reaction is medium acid to very strongly acid unless the surface layer has been limed. The content of chert fragments ranges from 15 to 35 percent throughout the profile. The depth to bedrock is more than 5 feet.

The Ap or A horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 or 4. It is gravelly silt loam.

The E horizon, if it occurs, has hue of 10YR or 7.5YR, value of 5 or 6, and chroma of 2 to 4. It is gravelly silt loam.

The upper part of the Bt horizon has hue of 7.5YR or 5YR, value of 4 or 5, and chroma of 4 to 6. The lower part has hue of 5YR to 10R, value of 4 or 5, and chroma of 6 to 8. The horizon is mottled in shades of yellow, brown, or red. The texture of the fine-earth fraction is typically silty clay or clay but ranges to silty clay loam in the upper part of the horizon.

Sulphura Series

The Sulphura series consists of moderately deep, somewhat excessively drained soils on highly dissected uplands. These soils formed in material weathered from interbedded siltstone, limestone, and shale. Slopes range from 20 to 60 percent.

Sulphura soils are geographically associated with Hawthorne, Ennis, and Minvale soils. Hawthorne soils are on the higher parts of steep side slopes above the Sulphura soils. They are deeper than 40 inches to hard bedrock. Ennis soils are on small, narrow flood plains below the Sulphura soils. They are well drained. Minvale soils are on colluvial foot slopes and benches. They are well drained and are more than 60 inches deep over bedrock. The content of fragments in their solum is less than 35 percent.

Typical pedon of Sulphura gravelly silt loam, in an area of the Hawthorne-Sulphura association, steep, 3.5 miles southeast of Lillamay, 6.7 miles northeast of the intersection of U.S. Highway 70 and Tennessee Highway 249, about 0.2 mile southeast of the intersection of Tennessee Highway 249 and Pond Creek Road, 500 feet south of Pond Creek Road, in a wooded area. (Atlas sheet 21)

A—0 to 3 inches; brown (10YR 5/3) gravelly silt loam; weak fine granular structure; very friable; common fine and medium roots; 20 percent angular fragments of chert and channers of siltstone 1/2 inch to 5 inches in diameter; strongly acid; clear smooth boundary.

E—3 to 10 inches; yellowish brown (10YR 5/4) gravelly silt loam; few fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; very friable; common medium and fine roots; 30 percent angular fragments of chert and channers of siltstone 1/2 inch to 5 inches in diameter; strongly acid; gradual smooth boundary.

Bw—10 to 22 inches; yellowish brown (10YR 5/6) very channery silt loam; weak medium subangular blocky structure; friable; few fine and medium roots; 60 percent channers of siltstone; strongly acid; gradual irregular boundary.

R—22 inches; hard, gray limestone bedrock.

The thickness of the solum ranges from 20 to 40 inches. Reaction is strongly acid or medium acid in the upper part of the profile and ranges from strongly acid to slightly acid in the lower part. The content of rock

fragments ranges from 10 to 25 percent in the A and E horizons and from 35 to 60 percent in the B horizon. Depth to hard bedrock ranges from 20 to 40 inches.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 or 3. It is gravelly silt loam or channery silt loam.

The E horizon has hue of 10YR, value of 4 to 6, and chroma of 3 or 4. It is gravelly silt loam or channery silt loam.

The Bw and Bt horizons, if they occur, have hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 4 to 6. They are very channery silt loam or very channery silty clay loam.

The Cr horizon, if it occurs, is horizontally bedded, highly fractured siltstone or shale.

The R horizon is hard limestone or shale bedrock.

Taft Series

The Taft series consists of very deep, somewhat poorly drained soils that formed in loess and in the underlying limestone residuum. These nearly level soils are on uplands and terraces. They has a fragipan in the lower part of the subsoil. Slopes range from 0 to 2 percent.

Taft soils are geographically associated with Dickson and Guthrie soils. Dickson soils are in the slightly higher positions on the landscape. They are moderately well drained. Guthrie soils are in the lower, flatter positions of the landscape. They are poorly drained.

Typical pedon of Taft silt loam, 4.0 miles northwest of Thomasville, 1.3 miles west of the intersection of Thomasville Road and Buster Shearon Road, 0.2 mile east of the intersection of Buster Shearon Road and Fendrix Shearon Road, 100 feet north of Buster Shearon Road, in a pastured area. (Atlas sheet 1)

Ap—0 to 9 inches; pale brown (10YR 6/3) silt loam; few fine prominent strong brown (7.5YR 4/6) and many fine faint brown (10YR 5/3) mottles; weak medium granular structure; very friable; common fine roots; neutral; clear smooth boundary.

Bw—9 to 23 inches; light yellowish brown (2.5Y 6/4) silt loam; common medium prominent yellowish brown (10YR 5/8) and light gray (10YR 7/2) mottles; weak medium subangular blocky structure; friable; few fine roots; slightly acid; clear wavy boundary.

E/Bx—23 to 29 inches; light yellowish brown (2.5Y 6/4) peds of silt loam with common prominent brownish yellow (10YR 6/8) mottles (B part); light brownish gray (10YR 6/2) silt loam between peds and on faces of peds (E part); moderate medium prismatic structure parting to moderate medium subangular blocky; firm; few fine iron and manganese concretions and nodules; thin tongues of silt and clay in vertical seams; strongly acid; clear wavy boundary.

Btx1—29 to 37 inches; light yellowish brown (2.5Y 6/4) silt loam; common medium prominent light gray (10YR 7/2) and few fine prominent gray (10YR 6/1) and yellowish brown (10YR 5/6) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; firm, brittle; few fine iron and manganese concretions and nodules; tongues of light gray silt and clay in vertical seams; few fine fragments of chert; strongly acid; clear wavy boundary.

Btx2—37 to 50 inches; light brownish gray (10YR 6/2) silty clay loam; common medium prominent brownish yellow (10YR 6/8) and common coarse faint light gray (10YR 7/1) mottles; moderate coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle; few fine iron and manganese concretions; tongues of light gray silt and clay in vertical seams; strongly acid; gradual wavy boundary.

Btx3—50 to 58 inches; light brownish gray (10YR 6/2) silt loam; common coarse distinct yellowish brown (10YR 6/6), few fine prominent strong brown (7.5YR 5/6), and common medium faint light gray (10YR 7/1) mottles; moderate very coarse prismatic structure parting to moderate medium subangular blocky; very firm, brittle; tongues of light gray silt and clay in vertical seams; few fine chert fragments; strongly acid; gradual wavy boundary.

2Bt—58 to 62 inches; mottled strong brown (7.5YR 5/6), brownish yellow (10YR 6/6), light yellowish brown (10YR 6/4), and gray (10YR 5/1) clay; moderate medium subangular blocky structure; firm; common medium prominent clay films on faces of peds; strongly acid.

The thickness of the solum is more than 50 inches. Reaction is very strongly acid or strongly acid unless the surface layer has been limed. The depth to bedrock is more than 5 feet.

The Ap or A horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. It is silt loam.

The Bw horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is mottled in shades of brown, yellow, or gray. It is silt loam.

The E horizon and the E part of the E/Bx horizon have hue of 10YR or 2.5Y, value of 5 or 7, and chroma of 1 to 3. They typically are mottled in shades of brown and yellow. Many pedons have an evenly mottled pattern in shades of gray, brown, and yellow. The texture is silt loam.

The Btx horizon has hue of 10YR or 2.5Y, value of 5 or 6, and chroma of 3 or 4. It is mottled in shades of brown, yellow, or gray. It is silt loam or silty clay loam.

The 2Bt horizon has hue of 10YR to 5Y and value and chroma of 4 to 6. In some pedons it has an evenly mottled pattern in shades of yellow, brown, red, and gray. The texture ranges from silt loam to clay.

Tarklin Series

The Tarklin series consists of very deep, moderately well drained soils on foot slopes and stream terraces. These soils formed in alluvium or colluvium from chert limestone. They have a fragipan in the subsoil. Slopes range from 2 to 12 percent.

Tarklin soils are geographically associated with Byler, Ennis, Hawthorne, and Sulphura soils. Byler soils are on stream terraces in landscape positions similar to those of the Tarklin soils. They are moderately well drained, and the content of fragments in the upper part of their solum is less than 15 percent. Ennis soils are on adjacent flood plains. They are well drained. The gravelly Hawthorne and Sulphura soils are on steep upland side slopes. They are somewhat excessively drained and do not have a fragipan.

Typical pedon of Tarklin gravelly silt loam, 5 to 12 percent slopes, eroded, 2.6 miles east of Ashland City, 1.9 miles northeast of the intersection of Tennessee Highway 12 and Dry Fork Creek Road, 1.2 miles west of the intersection of Dry Fork Creek Road and Valley View Road, 15 feet north of Dry Fork Creek Road. (Atlas sheet 15)

Ap—0 to 8 inches; brown (10YR 5/3) gravelly silt loam; weak fine granular structure; very friable; many fine roots; 20 percent chert and siltstone fragments; slightly acid; clear smooth boundary.

Bt1—8 to 16 inches; yellowish brown (10YR 5/6) gravelly silt loam; common fine distinct light yellowish brown (10YR 6/4) and common fine distinct strong brown (7.5YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine and medium roots; 25 percent chert and siltstone fragments; few fine faint clay films on faces of peds; few fine iron and manganese stains and concretions; strongly acid; clear wavy boundary.

Bt2—16 to 25 inches; strong brown (7.5YR 5/6) gravelly silt loam; common fine prominent light yellowish brown (10YR 6/4) and common fine distinct yellowish brown (10YR 5/6) mottles; weak medium subangular blocky structure; friable; common fine roots; 35 percent chert and siltstone fragments; few fine faint clay films on faces of peds; few fine iron and manganese stains and concretions; very strongly acid; clear wavy boundary.

Btx—25 to 60 inches; mottled strong brown (7.5YR 5/6), yellow (10YR 7/6), light yellowish brown (10YR 6/4), and light gray (10YR 7/2) very gravelly silt loam; moderate coarse and very coarse prismatic structure parting to moderate medium subangular blocky; very firm; few fine roots in vertical seams; vertical and horizontal seams of light gray silt and clay 1/4 to 1 inch in diameter, 5 to 10 inches apart; 50 percent chert and siltstone fragments; compact and brittle in more than 80 percent of the mass; few fine iron and manganese concretions; very strongly acid.

The thickness of the solum ranges from 40 to more than 60 inches. Reaction is extremely acid to strongly acid unless the surface layer has been limed. The content of gravel ranges from 15 to 35 percent in the upper part of the solum and from 15 to 50 percent in the Btx and C horizons. Depth to the fragipan ranges from 18 to 30 inches. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 2 to 4. It is gravelly silt loam.

The Bt horizon has hue of 10YR or 7.5YR and value and chroma of 4 to 6. In some pedons the lower part of the Bt horizon is mottled in shades of yellow, brown, or gray. The texture is gravelly silt loam or gravelly silty clay loam.

The Btx horizon has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is mottled in shades of gray, yellow, or brown. In many pedons it does not have a dominant matrix color but is evenly mottled. The texture of the fine-earth fraction is silt loam or silty clay loam.

The C horizon, if it occurs, has hue of 10YR, 7.5YR, or 5YR, value of 4 to 6, and chroma of 3 to 6. It is mottled in shades of red, gray, or brown. The texture of the fine-earth fraction is silt loam or silty clay loam.

Wolftever Series

The Wolftever series consists of very deep, moderately well drained soils on low stream terraces along the Cumberland and Harpeth Rivers. These soils formed in clayey alluvium. Slopes range from 0 to 12 percent.

Wolftever soils are geographically associated with Beason, Arrington, Melvin, and Newark soils. Beason soils are in the slightly lower positions on stream terraces. They are somewhat poorly drained. Arrington soils are adjacent to stream and river channels. They are well drained, are loamy in texture, and have a mollic epipedon. Melvin and Newark soils are in

narrow flood plains adjacent to steep side slopes. They are loamy in texture. Melvin soils are poorly drained. Newark soils are somewhat poorly drained.

Typical pedon of Wolftever silty clay loam, 0 to 2 percent slopes, occasionally flooded, 0.5 mile southwest of the Cheatham County Courthouse in Ashland City, 0.3 mile south of the intersection of Tennessee Highway 49 and Bypass, 50 feet southwest of the intersection of Bypass and a farm path, in a pastured area directly south of the State Industries plant. (Atlas sheet 15)

Ap—0 to 6 inches; brown (10YR 4/3) silty clay loam; weak medium granular structure; very friable; common fine roots; medium acid; clear smooth boundary.

BA—6 to 10 inches; dark yellowish brown (10YR 4/4) silty clay loam; few fine faint brown (10YR 4/3) mottles; moderate medium subangular blocky structure; friable; common fine roots; few distinct clay films on faces of peds; medium acid; clear smooth boundary.

Bt1—10 to 22 inches; dark brown (7.5YR 4/4) silty clay; few fine distinct yellowish brown (10YR 5/4) mottles; strong medium subangular blocky structure; firm; few fine roots; many coarse prominent clay films on faces of peds; strongly acid; clear wavy boundary.

Bt2—22 to 37 inches; yellowish brown (10YR 5/4) silty clay; common medium faint dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) and few fine distinct light gray (10YR 7/2) mottles; strong medium subangular blocky structure; firm; few fine roots; many coarse prominent clay films on faces of peds; strongly acid; gradual wavy boundary.

Bt3—37 to 51 inches; yellowish brown (10YR 5/4) silty clay; common medium distinct light gray (10YR 7/2) and yellowish brown (10YR 5/8) mottles; moderate medium subangular blocky structure; firm; common medium distinct clay films on faces of peds; common iron and manganese stains and concretions; strongly acid; gradual wavy boundary.

BC—51 to 60 inches; mottled light gray (10YR 7/2), yellowish brown (10YR 5/4), and brownish yellow (10YR 6/8) silty clay loam; weak and moderate medium subangular blocky structure; friable; few fine faint clay films on faces of peds; few iron and manganese stains and concretions; strongly acid.

The thickness of the solum ranges from 40 to 60 inches. Reaction is strongly acid or very strongly acid unless the surface layer has been limed. The depth to bedrock is more than 5 feet.

The Ap horizon has hue of 10YR, value of 4 or 5, and chroma of 2 to 4. It is silty clay loam or silt loam.

The BA horizon, if present, has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is silty clay loam.

The Bt horizon has hue of 2.5Y to 7.5YR and value and chroma of 4 to 6. It is mottled in shades of brown, yellow, or gray. It is silty clay, clay, or silty clay loam.

The BC horizon, if present, has an evenly mottled pattern of brown, gray, and yellow. It is silty clay loam or silt loam.

Formation of the Soils

The main factors of soil formation are parent material, time, climate, topography, and living organisms. The combined effects of these factors determine the characteristics and properties of soils.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. The character of this mass affects the kind of profile that develops and the degree of development. The three kinds of parent material in Cheatham County are loess (windblown silt), residuum of Mississippian siltstone and limestone, and recent alluvium.

The loess blankets most of the uplands in the northern part of the county. The thickness of the loess ranges from about 3 feet to less than 1 foot. The well developed Dickson, Taft, and Guthrie soils formed in this material. The upper part of Mountview soils formed in loess, and the lower part formed in the clayey residuum of limestone. Sengtown soils formed in the clayey residuum of limestone. Hawthorne and Sulphura soils, which are on steep and very steep hillsides in the southern and central parts of the county, formed in loamy material that weathered mostly from siltstone and shale. These steep and very steep soils are characterized by less profile development than the undulating and rolling soils in the northern part of the county. Armour, Beason, Byler, Tarklin, and Wolftever soils, which are on stream terraces, formed in material that is a combination of loess, alluvium, and colluvium. The least developed soils in the county formed in recent alluvium on flood plains. Arrington, Ennis, Lindside, Nolin, and Melvin soils formed in alluvium.

Time

The age of soils varies considerably. The length of time that a soil has been forming is generally reflected in the degree of profile development. Old soils generally have better defined horizons than young soils.

The effects of time on soil formation are most apparent in the northern part of the county. Dickson, Mountview, and Sengtown soils, which are the dominant soils on gently sloping ridges and the steeper side slopes, exhibit significant profile development. The central and southern parts of the county are characterized by the slightly younger Hawthorne and Sulphura soils. Soils of intermediate age, such as Byler and Armour soils, formed in silty material deposited on stream terraces. The youngest soils are the Ennis and Nolin soils on flood plains. These soils formed in recent alluvium. They have not been in place long enough to develop distinct horizons and are still receiving new material annually.

Climate

Climate affects the physical, chemical, and biological relationships in the soil, primarily through the influence of precipitation and temperature. These relationships significantly influence the rates of weathering, erosion, and organic matter decomposition. The leaching of nutrients in a soil is related to the amount of rainfall and its movement through the soil. The effects of climate control the kinds of plants and animals on and in the soil. Temperature influences the kind and growth of organisms and the speed of chemical and physical reactions in the soil.

Cheatham County has a warm, humid climate characteristic of the southeastern part of the United States. The climate varies so little within the county that it has not caused differences among the soils. The mild temperatures and abundant rainfall cause an intense leaching of soluble and colloidal material and a rapid decomposition of organic matter. As it moves downward in the soil, some of the translocated material accumulates in the lower layers and some moves out of the soils. Generally, the older, well developed soils in the county are strongly weathered, highly leached, acid, and low in fertility.

Topography

Topography, including relief, slope, landform, and aspect, influences or modifies the effects of the other soil-forming factors. The steepness, shape, and length of slopes directly influence the rate of water infiltration and the runoff rate. Areas where the runoff rate is most rapid generally are more eroded than other areas. The steeper slopes in many areas of the county are a result of rapid downcutting by stream and runoff action, exposing the parent material to soil-forming factors. These sloping areas have profiles that are undergoing development and have not reached the maturity that soils in more stable landscapes have achieved. Other areas below steep hillsides have soils formed as a result of various forms of mass wasting, such as creep, soil flow, and slump. Soils in these areas have loamy profiles of intermediate age formed from soils and parent materials on adjacent landscapes.

Water tends to concentrate on concave slopes. More of the water infiltrates the gentler slopes. In many areas of the county, free water moving downward through the soils is trapped or perched above a relatively impermeable fragipan, where it stands for days or weeks or, in some places, moves away laterally.

Soils on flood plains are periodically covered with fresh sediments washed from the adjacent uplands and deposited by stream overflow. This repeated deposition results in stratified soils characterized by minimum profile development.

Living Organisms

Plants and large and small animals are active forces of soil formation. Living organisms transfer soil material in many ways. When a tree falls, the roots bring soil material to the surface. Ants and crawfish construct mounds that generally contain material from the subsoil. The moving animals and growing plants blend soil ingredients into a uniform mixture. The plant roots break up stratified sediments and dislodge rock fragments.

Microscopic organisms affect the chemical environment within the soil and are essential for plant growth and survival. Air and water can move through old root holes. Decaying plants release nutrients and organic acids. Living roots absorb water and nutrients, increase carbon dioxide levels, lower oxygen levels, and increase acidity.

Living organisms also affect the color of soils. Well drained soils are red, brown, or yellow, and poorly drained soils are mottled in shades of gray. Red, yellow, and dark brown iron and manganese compounds coat mineral grains. When the soil is saturated and roots and microorganisms use oxygen faster that it can be replenished, some iron compounds dissolve and are translocated downward. Manganese compounds become indurated, and small dark brown or black nodules and concretions form. The mineral grains turn gray as they lose their coatings, and gray mottles form at the depth of the seasonal high water table.

References

American Association of State Highway and Transportation Officials. 1986. Standard specifications for highway materials and methods of sampling and testing. Ed. 14, 2 vols.

American Society for Testing and Materials. 1993. Standard classification of soils for engineering purposes. ASTM Stand. D 2487.

Ashland City Times. Ashland City Times Cheatham County fact book, 1988. 1988. pp. 3-90.

Bond, Octavia Z. 1986. A history of the Cheatham family, part 1. p. 10A. (Originally published in the Nashville American, August 22, 1909)

The Goodspeed histories of Montgomery, Robertson, Humphreys, Stewart, Dickson, Cheatham, and Houston Counties of Tennessee. 1972. pp. 947-974.

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Dep. Agric. Handb. 210.

United States Department of Agriculture, Soil Conservation Service. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. U.S. Dep. Agric. Handb. 436. (Revised in 1999)

United States Department of Agriculture, Soil Conservation Service. 1993. Soil survey manual. Soil Surv. Staff, U.S. Dep. Agric. Handb. 18.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 40-inch profile or to a limiting layer is expressed as:

Very low	0 to 2
Low	2 to 4
Moderate	4 to 6
High	more than 6

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Channery soil material. Soil material that is, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosion. Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Creep. An imperceptible and nonaccelerating downslope movement of soil material and rock.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic).—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated).—Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fine textured soil. Sandy clay, silty clay, or clay.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and

chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Rippable. Rippable bedrock or hardpan can be excavated using a single-tooth ripping attachment mounted on a tractor with a 200-300 drawbar horsepower rating.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil flow. A result of excessive rainfall and oversaturation of soil material on hillsides or on toe slopes, most often developing at the head of streams.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging

between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Talus. Fragments of rock and other soil material accumulated by gravity at the foot of cliffs or steep slopes.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Terracette. A sequum of smooth benches ending with short, steep side slopes resembling a stairstep pattern on stream terraces.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material that is too thin for the specified use.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Tables

Table 1.--Temperature and Precipitation

(Recorded in the period 1971-87 at Cheatham Lock, Tennessee)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In	In	In
January---	45.7	24.2	35.0	71	5	32	3.79	1.65	5.61	7	2.1
February--	52.0	27.3	39.7	78	5	39	3.67	2.09	5.07	7	3.0
March-----	64.2	37.0	50.6	85	15	125	5.65	2.83	8.08	8	.4
April-----	70.3	42.5	56.4	88	25	212	4.26	2.03	6.19	8	.0
May-------	77.9	51.2	64.6	91	33	453	5.04	2.92	6.92	8	.0
June------	86.0	60.1	73.1	98	41	693	3.91	2.18	5.43	6	.0
July------	90.1	65.5	77.8	100	53	862	4.45	1.82	6.67	8	.0
August----	89.0	63.8	76.4	99	51	818	3.20	1.51	4.66	6	.0
September-	82.8	57.7	70.3	96	40	609	4.30	1.87	6.45	6	.0
October---	71.5	44.2	57.9	88	26	275	2.91	1.38	4.23	5	.0
November--	61.1	36.1	48.6	82	16	78	4.95	2.30	7.21	7	.2
December--	51.6	29.1	40.4	72	5	18	5.01	2.53	7.16	8	.0
Yearly:											
Average--	70.2	44.9	57.6	---	---	---	---	---	---	---	---
Extreme--	---	---	---	100	5	---	---	---	---	---	---
Total----	---	---	---	---	---	4,214	51.14	45.73	61.90	84	5.7

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

Table 2.--Freeze Dates in Spring and Fall

(Recorded in the period 1971-87 at Cheatham Lock, Tennessee)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 8	Apr. 14	May 2
2 years in 10 later than--	Apr. 3	Apr. 9	Apr. 26
5 years in 10 later than--	Mar. 24	Apr. 1	Apr. 15
First freezing temperature in fall:			
1 year in 10 earlier than--	Oct. 28	Oct. 16	Sep. 29
2 years in 10 earlier than--	Nov. 5	Oct. 24	Oct. 9
5 years in 10 earlier than--	Nov. 20	Nov. 8	Oct. 27

Table 3.--Growing Season

(Recorded in the period 1971-87 at Cheatham Lock, Tennessee)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	210	195	160
8 years in 10	221	204	172
5 years in 10	240	221	194
2 years in 10	260	237	216
1 year in 10	270	246	227

Table 4.--Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
AmA	Armour silt loam, 0 to 2 percent slopes	256	0.1
AmB2	Armour silt loam, 2 to 5 percent slopes, eroded	856	0.4
AmC2	Armour silt loam, 5 to 12 percent slopes, eroded	1,347	0.7
ArA	Arrington silt loam, 0 to 2 percent slopes, occasionally flooded	1,715	0.9
ArB	Arrington silt loam, 2 to 8 percent slopes, occasionally flooded	563	0.3
Be	Beason silty clay loam, occasionally flooded	2,515	1.3
ByB2	Byler silt loam, 2 to 5 percent slopes, eroded	2,841	1.4
ByC2	Byler silt loam, 5 to 12 percent slopes, eroded	1,313	0.7
DkB2	Dickson silt loam, 2 to 5 percent slopes, eroded	5,795	3.0
En	Ennis gravelly silt loam, occasionally flooded	3,717	1.9
EwB2	Etowah silt loam, 2 to 5 percent slopes, eroded	113	0.1
EwC2	Etowah silt loam, 5 to 12 percent slopes, eroded	275	0.1
Gu	Guthrie silt loam, occasionally flooded	515	0.3
HaC	Hawthorne gravelly silt loam, 5 to 12 percent slopes	8,296	4.2
HaD	Hawthorne gravelly silt loam, 12 to 20 percent slopes	10,762	5.5
HsF	Hawthorne-Sulphura association, steep	67,472	34.4
HuB	Humphreys gravelly silt loam, 2 to 5 percent slopes	200	0.1
HuC	Humphreys gravelly silt loam, 5 to 12 percent slopes	239	0.1
Ld	Lindside silt loam, occasionally flooded	1,381	0.7
Me	Melvin silt loam, frequently flooded	1,587	0.8
MnC2	Minvale gravelly silt loam, 5 to 12 percent slopes, eroded	1,077	0.5
MnD2	Minvale gravelly silt loam, 12 to 20 percent slopes, eroded	746	0.4
MtB2	Mountview silt loam, 2 to 5 percent slopes, eroded	3,536	1.8
MtC2	Mountview silt loam, 5 to 12 percent slopes, eroded	9,603	4.9
Ne	Newark silt loam, frequently flooded	484	0.2
No	Nolin silt loam, occasionally flooded	3,713	1.9
Pt	Pits, quarry	20	*
Rc	Rock outcrop, very steep	2,554	1.3
SgB2	Sengtown gravelly silt loam, 2 to 5 percent slopes, eroded	272	0.1
SgC2	Sengtown gravelly silt loam, 5 to 12 percent slopes, eroded	29,529	15.0
SgD2	Sengtown gravelly silt loam, 12 to 20 percent slopes, eroded	16,436	8.4
SgF	Sengtown gravelly silt loam, 20 to 60 percent slopes	6,256	3.2
SrF	Sengtown-Rock outcrop complex, 20 to 60 percent slopes	2,960	1.5
Ta	Taft silt loam	1,131	0.6
TrB2	Tarklin gravelly silt loam, 2 to 5 percent slopes, eroded	151	0.1
TrC2	Tarklin gravelly silt loam, 5 to 12 percent slopes, eroded	2,313	1.2
Ud	Udorthents, clayey	233	0.1
WfA	Wolftever silty clay loam, 0 to 2 percent slopes, occasionally flooded	1,266	0.6
WfC	Wolftever silty clay loam, 5 to 12 percent slopes, occasionally flooded	262	0.1
	Water	2,100	1.1
	Total	196,400	100.0

* Less than 0.1 percent.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture

(Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability	Corn	Soybeans	Grain sorghum	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Bu	Lbs	Bu	Tons	AUM*
AmA---------- Armour	I	125	50	120	3,000	55	4.5	9.0
AmB2---------- Armour	IIe	115	45	105	2,900	55	4.5	8.5
AmC2---------- Armour	IIIe	105	40	---	2,700	50	4.0	8.0
ArA---------- Arrington	IIw	125	45	120	---	---	---	8.5
ArB---------- Arrington	IIe	110	40	105	---	---	---	8.0
Be---------- Beason	IIw	75	40	70	---	---	---	7.5
ByB2---------- Byler	IIe	85	35	80	2,400	45	---	7.5
ByC2---------- Byler	IIIe	75	30	70	2,300	40	---	7.0
DkB2---------- Dickson	IIe	85	35	80	2,600	45	---	7.5
En---------- Ennis	IIw	80	35	75	2,200	---	---	7.0
EwB2---------- Etowah	IIe	110	45	100	2,900	50	4.5	8.5
EwC2---------- Etowah	IIIe	100	40	95	2,300	45	4.0	8.0
Gu---------- Guthrie	IVw	---	---	---	---	---	---	5.5
HaC---------- Hawthorne	IVs	---	---	---	---	---	---	4.5
HaD---------- Hawthorne	VIs	---	---	---	---	---	---	4.0
HsF---------- Hawthorne-Sulphura	VIIs	---	---	---	---	---	---	---
HuB---------- Humphreys	IIe	90	35	85	2,300	50	3.5	8.0
HuC---------- Humphreys	IIIe	80	30	75	2,150	45	3.0	7.5
Ld---------- Lindside	IIw	115	45	110	---	45	---	8.5

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Grain sorghum	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Bu	Lbs	Bu	Tons	AUM*
Me---------- Melvin	IVw	---	30	55	---	---	---	6.0
MnC2---------- Minvale	IIIe	75	30	70	2,000	40	3.5	7.5
MnD2---------- Minvale	IVe	---	---	---	---	35	3.0	6.5
MtB2---------- Mountview	IIe	100	40	95	2,800	50	4.0	8.5
MtC2---------- Mountview	IIIe	90	35	85	2,600	45	3.5	8.0
Ne---------- Newark	IIIw	80	30	75	---	---	---	7.5
No---------- Nolin	IIw	120	45	115	2,600	---	---	9.0
Pt**. Pits								
Rc**. Rock outcrop								
SgB2---------- Sengtown	IIe	90	35	85	2,500	45	4.0	8.0
SgC2---------- Sengtown	IIIe	80	30	75	2,300	40	3.5	7.5
SgD2---------- Sengtown	IVe	---	---	---	---	35	3.0	6.5
SgF---------- Sengtown	VIIe	---	---	---	---	---	---	5.0
SrF**---------- Sengtown-Rock outcrop	VIIs	---	---	---	---	---	---	---
Ta---------- Taft	IIIw	65	30	60	---	---	---	6.5
TrB2---------- Tarklin	IIe	80	30	75	2,100	40	---	6.5
TrC2---------- Tarklin	IIIe	70	25	65	2,000	35	---	6.0
Ud*. Udorthents								
WfA---------- Wolftever	IIw	85	35	80	2,300	---	---	7.5

See footnotes at end of table.

Table 5.--Land Capability and Yields per Acre of Crops and Pasture--Continued

Soil name and map symbol	Land capability	Corn	Soybeans	Grain sorghum	Tobacco	Wheat	Alfalfa hay	Tall fescue-ladino
		Bu	Bu	Bu	Lbs	Bu	Tons	AUM*
WfC---------- Wolftever	IIIe	75	30	70	2,100	---	---	7.0

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 6.--Prime Farmland

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland)

Map symbol	Soil name
AmA	Armour silt loam, 0 to 2 percent slopes
AmB2	Armour silt loam, 2 to 5 percent slopes, eroded
ArA	Arrington silt loam, 0 to 2 percent slopes, occasionally flooded
ArB	Arrington silt loam, 2 to 8 percent slopes, occasionally flooded
Be	Beason silty clay loam, occasionally flooded
ByB2	Byler silt loam, 2 to 5 percent slopes, eroded
DkB2	Dickson silt loam, 2 to 5 percent slopes, eroded
En	Ennis gravelly silt loam, occasionally flooded
EwB2	Etowah silt loam, 2 to 5 percent slopes, eroded
HuB	Humphreys gravelly silt loam, 2 to 5 percent slopes
Ld	Lindside silt loam, occasionally flooded
MtB2	Mountview silt loam, 2 to 5 percent slopes, eroded
No	Nolin silt loam, occasionally flooded
SgB2	Sengtown gravelly silt loam, 2 to 5 percent slopes, eroded
TrB2	Tarklin gravelly silt loam, 2 to 5 percent slopes, eroded
WfA	Wolftever silty clay loam, 0 to 2 percent slopes, occasionally flooded

Table 7.--Woodland Management and Productivity

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume*	
AmA, AmB2, AmC2-Armour	Slight	Slight	Slight	Slight	Moderate	Southern red oak---- Eastern redcedar---- White oak---------- Yellow poplar------- Loblolly pine-------	70 43 70 90 77	57 43 57 86 100	Yellow poplar, loblolly pine, black walnut, white oak, southern red oak, hickory, eastern white pine.
ArA, ArB--------Arrington	Slight	Slight	Slight	Slight	Severe	Yellow poplar------- White oak---------- Southern red oak---- Loblolly pine------- Black walnut--------	100 80 80 90 ---	92 65 65 115 ---	Yellow poplar, black walnut, cherrybark oak, sweetgum, American sycamore, green ash.
Be--------------Beason	Slight	Moderate	Moderate	Slight	Moderate	Yellow poplar------- Sweetgum---------- White oak---------- Southern red oak---- Loblolly pine-------	90 80 70 70 80	86 86 57 57 114	American sycamore, sweetgum, yellow poplar, cherrybark oak, swamp white oak, green ash, pin oak.
ByB2, ByC2------Byler	Slight	Slight	Slight	Moderate	Moderate	Yellow poplar------- Southern red oak---- Loblolly pine------- Shortleaf pine------	90 70 80 70	86 57 114 114	Loblolly pine, black walnut, yellow poplar, white oak, southern red oak, eastern white pine.
DkB2------------Dickson	Slight	Slight	Slight	Moderate	Moderate	Yellow poplar------- White oak---------- Loblolly pine------- Shortleaf pine------	92 73 80 70	86 57 114 114	Loblolly pine, eastern white pine, yellow poplar, southern red oak, white oak.
En--------------Ennis	Slight	Slight	Moderate	Slight	Moderate	Yellow poplar------- White oak---------- Loblolly pine-------	100 80 90	114 57 129	Yellow poplar, American sycamore, black walnut, cherrybark oak, sweetgum.
EwB2------------Etowah	Slight	Slight	Slight	Slight	Moderate	Yellow poplar------- Southern red oak---- Loblolly pine------- Shortleaf pine------	90 80 90 80	86 57 129 129	Yellow poplar, black walnut, loblolly pine, southern red oak, white oak, eastern white pine.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
EwC2---------- Etowah	Slight	Slight	Slight	Slight	Moderate	Yellow poplar------- Southern red oak---- Loblolly pine------- Shortleaf pine------	90 80 90 80	86 57 129 129	Yellow poplar, black walnut, southern red oak, white oak, eastern white pine.
Gu---------- Guthrie	Slight	Moderate	Moderate	Moderate	Severe	Yellow poplar------- Southern red oak---- Loblolly pine------- Willow oak---------- Sweetgum------------	100 75 80 85 90	114 57 114 86 100	American sycamore, cherrybark oak, swamp white oak, sweetgum, willow oak, yellow poplar.
HaC---------- Hawthorne	Slight	Slight	Moderate	Slight	Moderate	Southern red oak---- Shortleaf pine------ Mockernut hickory---	60 60 ---	43 86 ---	White oak, eastern redcedar, mockernut hickory, chestnut oak, Virginia pine.
HaD---------- Hawthorne	Slight	Moderate	Moderate	Slight	Moderate	Southern red oak---- Shortleaf pine------ Mockernut hickory---	60 60 ---	43 86 ---	White oak, eastern redcedar, mockernut hickory, chestnut oak, Virginia pine.
HsF**:									
Hawthorne------	Moderate	Severe	Moderate	Slight	Moderate	Southern red oak---- Shortleaf pine------ Mockernut hickory---	60 60 ---	43 86 ---	Eastern redcedar, white oak, mockernut hickory, chestnut oak, Virginia pine.
Sulphura-------	Severe	Severe	Moderate	Moderate	Moderate	Loblolly pine------- Shortleaf pine------ Eastern redcedar----	65 55 35	86 72 29	Eastern redcedar, white oak, mockernut hickory, chestnut oak, Virginia pine.
HuB, HuC-------- Humphreys	Slight	Slight	Slight	Slight	Moderate	Yellow poplar------- Northern red oak---- Shortleaf pine------ Loblolly pine------- Black walnut--------	100 70 70 90 ---	114 57 114 129 ---	Yellow poplar, sweetgum, white oak, white ash, hickory, loblolly pine.
Ld---------- Lindside	Slight	Slight	Slight	Slight	Severe	Northern red oak---- Yellow poplar------- Black walnut-------- White ash---------- White oak---------- ---	86 95 --- 85 85 ---	72 100 --- 57 72 ---	Yellow poplar, black walnut, American sycamore, sweetgum, cherrybark oak.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Wind-throw hazard	Plant competition	Common trees	Site index	Volume*	
Me Melvin	Slight	Moderate	Moderate	Severe	Severe	Pin oak Sweetgum Green ash Hickory Cherrybark oak	99 89 --- --- 91	100 100 --- --- 114	Pin oak, American sycamore, sweetgum, swamp white oak, cherrybark oak, green ash, shagbark hickory, willow oak.
MnC2 Minvale	Slight	Slight	Slight	Slight	Moderate	Yellow poplar White oak Shortleaf pine Loblolly pine Virginia pine	90 70 70 80 70	86 57 114 114 114	Yellow poplar, white oak, hickory, southern red oak, eastern redcedar, loblolly pine.
MnD2 Minvale	Moderate	Moderate	Slight	Slight	Moderate	Yellow poplar White oak Shortleaf pine Loblolly pine Virginia pine	90 70 70 80 70	86 57 114 114 114	Yellow poplar, white oak, hickory, southern red oak, eastern redcedar, loblolly pine.
MtB2 Mountview	Slight	Slight	Slight	Slight	Moderate	Southern red oak Yellow poplar Shortleaf pine	70 90 65	57 86 100	Yellow poplar, white oak, southern red oak, hickory, eastern white pine.
MtC2 Mountview	Moderate	Slight	Slight	Slight	Moderate	Southern red oak Yellow poplar Shortleaf pine	70 90 65	57 86 100	Yellow poplar, white oak, southern red oak, hickory, eastern white pine.
Ne Newark	Slight	Moderate	Slight	Moderate	Severe	Pin oak Sweetgum Green ash Cherrybark oak Shumard oak Overcup oak	96 85 --- --- --- ---	72 86 --- --- --- ---	Cherrybark oak, Shumard oak, overcup oak, yellow poplar, sweetgum, American sycamore.
No Nolin	Slight	Slight	Slight	Slight	Severe	Yellow poplar Sweetgum Cherrybark oak Black walnut American sycamore	107 92 97 --- ---	114 114 143 --- ---	Yellow poplar, American sycamore, white ash, cherrybark oak, sweetgum, black walnut.

See footnotes at end of table.

Table 7.--Woodland Management and Productivity--Continued

Soil name and map symbol	Management concerns					Potential productivity			Trees to plant
	Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Volume*	
SgB2, SgC2--- Sengtown	Slight	Slight	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, eastern white pine, black walnut, white oak, hickory, white ash, southern red oak.
						Yellow poplar-------	90	86	
						Shortleaf pine------	70	114	
SgD2--- Sengtown	Moderate	Moderate	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, eastern white pine, black walnut, white oak, hickory, white ash, southern red oak.
						Yellow poplar-------	90	86	
						Shortleaf pine------	70	114	
SgF--- Sengtown	Severe	Severe	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, loblolly pine, shortleaf pine.
						Yellow poplar-------	90	86	
						Shortleaf pine------	70	114	
SrF**: Sengtown-------	Severe	Severe	Slight	Slight	Moderate	Southern red oak----	70	57	Yellow poplar, eastern white, pine, black walnut, white oak, hickory, white ash, southern red oak.
						Yellow poplar-------	90	86	
						Shortleaf pine------	70	114	
Rock outcrop.									
Ta--- Taft	Slight	Moderate	Moderate	Moderate	Severe	Yellow poplar-------	90	86	Loblolly pine, white oak, American sycamore, sweetgum, shagbark hickory.
						White oak----------	60	43	
						Loblolly pine-------	85	114	
						Sweetgum-----------	80	86	
						Shortleaf pine------	60	86	
TrB2, TrC2--- Tarklin	Slight	Slight	Slight	Slight	Moderate	Shortleaf pine------	65	100	Eastern white pine, black walnut, white oak, southern red oak, yellow poplar.
						White oak----------	74	57	
						Yellow poplar-------	---	---	
						Black oak----------	---	---	
						Sugar maple--------	---	---	
						American beech------	---	---	
						Eastern redcedar----	---	---	
WfA, WfC--- Wolftever	Slight	Slight	Moderate	Slight	Moderate	Yellow poplar-------	90	86	Yellow poplar, black walnut, sweetgum, swamp white oak, American sycamore, cherrybark oak, green ash.
						White oak----------	70	57	
						Southern red oak----	70	57	
						Willow oak---------	80	72	
						Sweetgum-----------	80	86	
						Loblolly pine-------	80	114	

* Volume is the yield in cubic feet per acre per year calculated at the age of culmination of mean annual increment for fully stocked natural stands.

** See description of the map unit for composition and behavior characteristics of the map unit.

Table 8.--Recreational Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
AmA Armour	Slight	Slight	Slight	Slight	Slight.
AmB2 Armour	Slight	Slight	Moderate: slope.	Slight	Slight.
AmC2 Armour	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
ArA Arrington	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
ArB Arrington	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Moderate: flooding.
Be Beason	Severe: flooding, wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness, flooding.
ByB2 Byler	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: slope, wetness.	Severe: erodes easily.	Slight.
ByC2 Byler	Moderate: slope, wetness.	Moderate: slope, wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
DkB2 Dickson	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: slope, wetness, percs slowly.	Severe: erodes easily.	Slight.
En Ennis	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight	Moderate: small stones, droughty, flooding.
EwB2 Etowah	Slight	Slight	Moderate: slope, small stones.	Slight	Slight.
EwC2 Etowah	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
Gu Guthrie	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
HaC Hawthorne	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight	Moderate: small stones, large stones, slope.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
HaD---------- Hawthorne	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
HsF*:					
Hawthorne----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Sulphura----------	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
HuB---------- Humphreys	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones, droughty.
HuC---------- Humphreys	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, droughty.
Ld---------- Lindside	Severe: flooding.	Moderate: wetness.	Moderate: wetness, flooding.	Moderate: wetness.	Moderate: flooding.
Me---------- Melvin	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
MnC2---------- Minvale	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.
MnD2---------- Minvale	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
MtB2---------- Mountview	Slight----------	Slight----------	Moderate: slope.	Severe: erodes easily.	Slight.
MtC2---------- Mountview	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
Ne---------- Newark	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.
No---------- Nolin	Severe: flooding.	Slight----------	Slight----------	Severe: erodes easily.	Moderate: flooding.
Pt*. Pits					
Rc*. Rock outcrop					
SgB2---------- Sengtown	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Slight----------	Moderate: small stones.
SgC2---------- Sengtown	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Slight----------	Moderate: small stones, slope.

See footnote at end of table.

Table 8.--Recreational Development--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
SgD2 Sengtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
SgF Sengtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
SrF*: Sengtown	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop.					
Ta Taft	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
TrB2 Tarklin	Moderate: small stones.	Moderate: wetness, small stones.	Severe: small stones.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
TrC2 Tarklin	Moderate: slope, small stones.	Moderate: slope, wetness, small stones.	Severe: slope, small stones.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
Ud*. Udorthents					
WfA Wolftever	Severe: flooding.	Moderate: percs slowly.	Moderate: flooding, percs slowly.	Slight	Moderate: flooding.
WfC Wolftever	Severe: flooding.	Moderate: slope, percs slowly.	Severe: slope.	Severe: erodes easily.	Moderate: flooding, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 9.--Wildlife Habitat

(See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
AmA, AmB2---------- Armour	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
AmC2---------- Armour	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
ArA, ArB---------- Arrington	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Be---------- Beason	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
ByB2, ByC2--------- Byler	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
DkB2---------- Dickson	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
En---------- Ennis	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
EwB2---------- Etowah	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
EwC2---------- Etowah	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Gu---------- Guthrie	Poor	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
HaC, HaD---------- Hawthorne	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
HsF*:										
Hawthorne---------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Sulphura----------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
HuB---------- Humphreys	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
HuC---------- Humphreys	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ld---------- Lindside	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Me---------- Melvin	Very poor.	Poor	Poor	Poor	Poor	Good	Good	Poor	Poor	Good.
MnC2---------- Minvale	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

See footnote at end of table.

Table 9.--Wildlife Habitat--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hardwood trees	Conif-erous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
MnD2--Minvale	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
MtB2--Mountview	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
MtC2--Mountview	Fair	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Poor.
Ne--Newark	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
No--Nolin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Pt*. Pits										
Rc*. Rock outcrop										
SgB2, SgC2--Sengtown	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
SgD2--Sengtown	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
SgF--Sengtown	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
SrF*: Sengtown	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Rock outcrop.										
Ta--Taft	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
TrB2--Tarklin	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
TrC2--Tarklin	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Ud*. Udorthents										
WfA--Wolftever	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
WfC--Wolftever	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 10.--Building Site Development

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
AmA, AmB2 Armour	Slight	Slight	Slight	Slight	Severe: low strength.	Slight.
AmC2 Armour	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: low strength.	Moderate: slope.
ArA, ArB Arrington	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Be Beason	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Moderate: wetness, flooding.
ByB2 Byler	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: low strength, wetness.	Slight.
ByC2 Byler	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: low strength, wetness.	Moderate: slope.
DkB2 Dickson	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: low strength.	Slight.
En Ennis	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: small stones, droughty, flooding.
EwB2 Etowah	Moderate: too clayey.	Slight	Slight	Slight	Moderate: low strength.	Slight.
EwC2 Etowah	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: slope.
Gu Guthrie	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness.
HaC Hawthorne	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, large stones, slope.
HaD Hawthorne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
HsF*: Hawthorne	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
HsF*: Sulphura	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
HuB Humphreys	Moderate: wetness.	Slight	Moderate: wetness.	Slight	Slight	Moderate: small stones, droughty.
HuC Humphreys	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Moderate: slope.	Moderate: small stones, droughty.
Ld Lindside	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
Me Melvin	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
MnC2 Minvale	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: low strength, slope.	Moderate: small stones, slope.
MnD2 Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
MtB2 Mountview	Moderate: too clayey.	Slight	Moderate: shrink-swell.	Slight	Severe: low strength.	Slight.
MtC2 Mountview	Moderate: too clayey, slope.	Moderate: slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Ne Newark	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding.
No Nolin	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Pt*. Pits						
Rc*. Rock outcrop						
SgB2 Sengtown	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Moderate: small stones.
SgC2 Sengtown	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
SgD2, SgF Sengtown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

Table 10.--Building Site Development--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
SrF*:						
Sengtown	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Rock outcrop.						
Ta	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
Taft						
TrB2	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Moderate: small stones, large stones, wetness.
Tarklin						
TrC2	Severe: wetness.	Moderate: wetness, slope.	Severe: wetness.	Severe: slope.	Moderate: wetness, slope.	Moderate: small stones, large stones, wetness.
Tarklin						
Ud*.						
Udorthents						
WfA	Moderate: too clayey, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
Wolftever						
WfC	Moderate: too clayey, wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: low strength, flooding.	Moderate: flooding, slope.
Wolftever						

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 11.--Sanitary Facilities

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
AmA Armour	Moderate: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight	Fair: too clayey, thin layer.
AmB2 Armour	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey, thin layer.
AmC2 Armour	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope, thin layer.
ArA, ArB Arrington	Severe: flooding.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Good.
Be Beason	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, wetness.
ByB2 Byler	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
ByC2 Byler	Severe: wetness, percs slowly.	Severe: slope.	Moderate: wetness, slope, too clayey.	Moderate: wetness, slope.	Fair: too clayey, slope, wetness.
DkB2 Dickson	Severe: wetness, percs slowly.	Severe: wetness.	Moderate: wetness, too clayey.	Moderate: wetness.	Fair: too clayey, wetness.
En Ennis	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage.	Severe: flooding, seepage.	Fair: small stones.
EwB2 Etowah	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
EwC2 Etowah	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey.
Gu Guthrie	Severe: flooding, wetness, percs slowly.	Slight	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
HaC Hawthorne	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock, seepage.	Poor: depth to rock, small stones.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
HaD---------- Hawthorne	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
HsF*:					
Hawthorne----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Sulphura----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
HuB---------- Humphreys	Moderate: wetness.	Severe: seepage.	Severe: seepage, wetness.	Severe: seepage.	Poor: small stones.
HuC---------- Humphreys	Moderate: wetness, slope.	Severe: seepage, slope.	Severe: seepage, wetness.	Severe: seepage.	Poor: small stones.
Ld---------- Lindside	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Me---------- Melvin	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
MnC2---------- Minvale	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, small stones.
MnD2---------- Minvale	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
MtB2---------- Mountview	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight----------	Poor: too clayey, hard to pack, small stones.
MtC2---------- Mountview	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack, small stones.
Ne---------- Newark	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
No---------- Nolin	Severe: flooding, wetness.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
Pt*. Pits					

See footnote at end of table.

Table 11.--Sanitary Facilities--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Rc*. Rock outcrop					
SgB2 Sengtown	Moderate: percs slowly.	Moderate: seepage, slope.	Severe: too clayey.	Slight	Poor: too clayey, hard to pack, small stones.
SgC2 Sengtown	Moderate: percs slowly, slope.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack, small stones.
SgD2, SgF Sengtown	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
SrF*: Sengtown	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, small stones.
Rock outcrop.					
Ta Taft	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: wetness.
TrB2 Tarklin	Severe: wetness, percs slowly.	Severe: seepage.	Severe: seepage, wetness.	Moderate: wetness.	Poor: small stones.
TrC2 Tarklin	Severe: wetness, percs slowly.	Severe: seepage, slope.	Severe: seepage, wetness.	Moderate: wetness, slope.	Poor: small stones.
Ud*. Udorthents					
WfA Wolftever	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack.
WfC Wolftever	Severe: flooding, wetness, percs slowly.	Severe: flooding, slope, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 12.--Construction Materials

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
AmA, AmB2 Armour	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
AmC2 Armour	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
ArA, ArB Arrington	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
Be Beason	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
ByB2 Byler	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
ByC2 Byler	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
DkB2 Dickson	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, area reclaim.
En Ennis	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
EwB2 Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey.
EwC2 Etowah	Fair: low strength, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, too clayey, slope.
Gu Guthrie	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
HaC Hawthorne	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
HaD Hawthorne	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
HsF*:				
Hawthorne	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Sulphura	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
HuB, HuC	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Humphreys				
Ld	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
Lindside				
Me	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Melvin				
MnC2	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Minvale				
MnD2	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Minvale				
MtB2, MtC2	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
Mountview				
Ne	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
Newark				
No	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, area reclaim.
Nolin				
Pt*.				
Pits				
Rc*.				
Rock outcrop				
SgB2, SgC2, SgD2	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Sengtown				
SgF	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Sengtown				

See footnote at end of table.

Table 12.--Construction Materials--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
SrF*:				
Sengtown	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, area reclaim.
Rock outcrop.				
Ta	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Taft				
TrB2, TrC2	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
Tarklin				
Ud*.				
Udorthents				
WfA, WfC	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Wolftever				

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 13.--Water Management

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
AmA---------- Armour	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
AmB2---------- Armour	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
AmC2---------- Armour	Severe: slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
ArA---------- Arrington	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
ArB---------- Arrington	Moderate: seepage.	Severe: piping.	Deep to water	Slope, erodes easily, flooding.	Erodes easily	Erodes easily.
Be---------- Beason	Slight---------	Severe: wetness.	Flooding-------	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
ByB2---------- Byler	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, rooting depth.
ByC2---------- Byler	Severe: slope.	Severe: piping.	Percs slowly, slope.	Slope, wetness, percs slowly.	Slope, erodes easily, wetness.	Slope, erodes easily, rooting depth.
DkB2---------- Dickson	Moderate: seepage, slope.	Severe: piping.	Percs slowly, slope.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness.	Erodes easily, rooting depth.
En---------- Ennis	Severe: seepage.	Severe: piping.	Deep to water	Droughty, flooding.	Favorable------	Favorable.
EwB2---------- Etowah	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
EwC2---------- Etowah	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Gu---------- Guthrie	Slight---------	Severe: piping, wetness.	Percs slowly, flooding.	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
HaC, HaD---------- Hawthorne	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
HsF*:						
Hawthorne	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Sulphura	Severe: slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
HuB	Severe: seepage.	Moderate: piping.	Deep to water	Slope, droughty.	Favorable	Droughty.
Humphreys						
HuC	Severe: seepage, slope.	Moderate: piping.	Deep to water	Slope, droughty.	Slope	Slope, droughty.
Humphreys						
Ld	Moderate: seepage.	Severe: piping.	Flooding, frost action.	Flooding, wetness, erodes easily.	Wetness, erodes easily.	Erodes easily.
Lindside						
Me	Moderate: seepage.	Severe: piping, wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
Melvin						
MnC2, MnD2	Moderate: seepage.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Minvale						
MtB2	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
Mountview						
MtC2	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Mountview						
Ne	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Wetness, erodes easily.
Newark						
No	Severe: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.
Nolin						
Pt*.						
Pits						
Rc*.						
Rock outcrop						
SgB2	Moderate: seepage, slope.	Moderate: hard to pack.	Deep to water	Slope	Favorable	Favorable.
Sengtown						
SgC2, SgD2, SgF	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope	Slope.
Sengtown						
SrF*:						
Sengtown	Severe: slope.	Moderate: hard to pack.	Deep to water	Slope	Slope	Slope.
Rock outcrop.						

See footnote at end of table.

Table 13.--Water Management--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
Ta Taft	Moderate: seepage.	Severe: piping.	Percs slowly	Wetness, percs slowly, rooting depth.	Erodes easily, wetness, rooting depth.	Wetness, erodes easily, rooting depth.
TrB2 Tarklin	Severe: seepage.	Severe: piping.	Percs slowly, slope.	Slope, wetness, droughty.	Wetness, rooting depth.	Droughty, rooting depth.
TrC2 Tarklin	Severe: seepage, slope.	Severe: piping.	Percs slowly, slope.	Slope, wetness, droughty.	Slope, wetness, rooting depth.	Slope, droughty, rooting depth.
Ud*. Udorthents						
WfA Wolftever	Slight	Severe: hard to pack.	Flooding	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
WfC Wolftever	Severe: slope.	Severe: hard to pack.	Flooding, slope.	Wetness, slope, erodes easily.	Slope, erodes easily, wetness.	Slope, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 14.--Engineering Index Properties

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	3-10 inches	4	10	40	200		
	In				Pct					Pct	
AmA---------- Armour	0-7	Silt loam	CL-ML, CL, ML	A-4	0	90-100	80-100	75-95	70-90	25-35	5-10
	7-60	Silty clay loam, silt loam.	CL	A-4, A-6	0	90-100	80-100	75-95	70-95	30-40	8-18
AmB2, AmC2------- Armour	0-4	Silt loam	CL-ML, CL, ML	A-4	0	90-100	80-100	75-95	70-90	25-35	5-10
	4-60	Silty clay loam, silt loam.	CL	A-4, A-6	0	90-100	80-100	75-95	70-95	30-40	8-18
ArA, ArB--------- Arrington	0-16	Silt loam	CL, ML, CL-ML	A-4, A-6	0	100	90-100	85-95	75-95	25-40	4-15
	16-60	Silt loam, silty clay loam.	CL, ML, CL-ML	A-4, A-6	0	95-100	90-100	85-100	75-95	25-40	4-15
Be---------- Beason	0-6	Silty clay loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	90-100	75-90	25-40	5-15
	6-13	Silty clay loam, silt loam.	CL	A-6	0	100	95-100	90-100	80-95	25-40	11-20
	13-60	Silty clay loam, silty clay, clay.	CL	A-6, A-7	0	100	95-100	90-95	80-95	30-49	11-25
ByB2, ByC2------- Byler	0-9	Silt loam	CL-ML, CL, ML	A-4	0	100	95-100	85-95	75-90	20-30	3-10
	9-24	Silt loam, silty clay loam.	CL-ML, CL, ML	A-4, A-6	0	100	95-100	85-100	85-95	20-40	3-15
	24-44	Silty clay loam, silt loam, gravelly silty clay loam.	CL, ML	A-6, A-4, A-7	0-5	80-100	75-100	70-100	60-95	30-45	8-20
	44-60	Clay, silty clay, gravelly clay.	MH, ML	A-7	0-10	65-100	60-100	55-95	50-90	40-60	12-25
DkB2---------- Dickson	0-9	Silt loam	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	20-28	2-7
	9-20	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	95-100	95-100	85-95	25-38	5-17
	20-49	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	25-42	7-20
	49-60	Clay, silty clay, cherty clay.	MH, ML, GC, CL	A-6, A-7	0-20	70-100	60-100	55-100	45-95	35-65	12-30
En---------- Ennis	0-7	Gravelly silt loam.	CL-ML, ML, SM, GM	A-4, A-6	0-5	55-85	50-85	40-80	35-70	<30	NP-12
	7-60	Gravelly silt loam, very gravelly silt loam, very gravelly silty clay loam.	ML, SM, GM, CL-ML	A-4, A-6, A-2	0-5	55-95	40-85	40-80	30-70	<35	NP-15
EwB2, EwC2------- Etowah	0-5	Silt loam	ML, CL, SC-SM, CL-ML	A-4	0	80-100	75-100	70-95	45-70	20-30	3-10
	5-34	Silty clay loam, clay loam, silt loam.	CL	A-6	0	80-100	75-100	70-95	65-85	25-35	10-15
	34-60	Silty clay loam, clay loam, clay.	CL, ML, MH	A-6, A-7	0	80-100	75-100	70-95	65-85	39-60	15-25

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Gu Guthrie	0-17	Silt loam	ML, CL-ML	A-4	0	100	100	90-100	85-95	18-28	2-7
	17-40	Silt loam, silty clay loam.	ML, CL-ML, CL	A-4, A-6	0	100	100	90-100	85-95	23-39	5-15
	40-52	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	90-100	85-100	80-100	70-95	20-42	5-20
	52-60	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-7, A-4	0-5	85-100	80-100	75-100	66-95	20-50	4-25
HaC, HaD Hawthorne	0-6	Gravelly silt loam.	ML, CL-ML, GM, GM-GC	A-4	0-10	60-80	55-75	50-70	40-65	18-30	3-9
	6-33	Very channery silty clay loam, very channery silt loam, very gravelly silt loam.	ML, CL-ML, GM, GM-GC	A-2, A-4, A-6	0-15	55-75	45-70	40-65	30-60	20-35	3-12
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
HsF*: Hawthorne	0-6	Gravelly silt loam.	ML, CL-ML, GM, GM-GC	A-4	0-10	60-80	55-75	50-70	40-65	18-30	3-9
	6-33	Very channery silty clay loam, very channery silt loam, very gravelly silt loam.	ML, CL-ML, GM, GM-GC	A-2, A-4, A-6	0-15	55-75	45-70	40-65	30-60	20-35	3-12
	33-60	Weathered bedrock	---	---	---	---	---	---	---	---	---
Sulphura	0-10	Gravelly silt loam.	ML, CL-ML, CL	A-4	0-8	70-90	65-85	60-80	55-75	20-32	2-10
	10-22	Very channery silt loam, very channery silty clay loam.	GC, GM-GC	A-2, A-4, A-6	5-20	45-60	40-55	35-50	30-45	23-32	6-12
	22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
HuB, HuC Humphreys	0-8	Gravelly silt loam.	ML, CL-ML, CL, GM-GC	A-4	0-5	60-75	55-75	50-70	35-55	18-28	3-10
	8-51	Gravelly silty clay loam, gravelly clay loam, gravelly silt loam.	CL, GC, SC	A-6	0-5	55-75	50-75	45-70	40-60	28-40	10-16
	51-60	Gravelly silty clay loam, gravelly clay loam, very gravelly clay loam.	CL, GC, SC	A-4, A-6, A-2	0-10	45-75	40-75	30-65	20-55	25-35	8-15
Ld Lindside	0-11	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	95-100	80-100	55-90	20-35	2-15
	11-42	Silty clay loam, silt loam, very fine sandy loam.	CL, ML, CL-ML	A-4, A-6	0	100	95-100	90-100	70-95	25-40	4-18
	42-60	Stratified silty clay loam to gravelly sandy loam.	CL, ML, SM, SC	A-2, A-4, A-6	0	60-100	55-100	45-100	30-95	20-40	4-18

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Me Melvin	0-10	Silt loam	CL, CL-ML, ML	A-4	0	95-100	90-100	80-100	80-95	25-35	4-10
	10-42	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	95-100	90-100	80-100	80-98	25-40	5-20
	42-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-4, A-6	0	85-100	80-100	70-100	60-98	25-40	5-20
MnC2, MnD2 Minvale	0-8	Gravelly silt loam.	ML, CL, GM, GC	A-4	0-5	55-80	50-75	40-70	36-60	<30	NP-10
	8-38	Gravelly silty clay loam, gravelly silt loam, gravelly loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	50-75	50-75	40-70	36-65	20-40	5-15
	38-60	Gravelly silty clay loam, gravelly silty clay.	CL, ML, GC, SC	A-4, A-6, A-7	0-5	55-80	50-75	40-70	36-65	25-50	7-23
MtB2, MtC2 Mountview	0-6	Silt loam	ML, CL-ML	A-4	0	100	95-100	95-100	80-96	20-30	2-7
	6-23	Silt loam, silty clay loam.	CL	A-6, A-7	0	95-100	95-100	90-100	80-96	30-43	10-23
	23-60	Clay, gravelly clay, gravelly silty clay loam.	CL, ML, MH, CH	A-6, A-7	0-20	75-100	65-100	60-98	50-96	35-65	11-32
Ne Newark	0-7	Silt loam	ML, CL, CL-ML	A-4	0	95-100	90-100	80-100	55-95	<32	NP-10
	7-26	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0	95-100	90-100	85-100	70-100	22-42	3-20
	26-60	Silt loam, silty clay loam.	ML, CL, CL-ML	A-4, A-6, A-7	0-3	75-100	70-100	65-100	55-95	22-42	3-20
No Nolin	0-6	Silt loam	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	80-100	25-40	5-18
	6-60	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	85-100	75-100	25-46	5-23
Pt*. Pits											
Rc*. Rock outcrop											
SgB2, SgC2, SgD2 Sengtown	0-5	Gravelly silt loam.	ML, CL, CL-ML, GM	A-4	0-5	60-90	55-80	45-75	45-70	25-35	4-10
	5-15	Gravelly silt loam, gravelly silty clay loam.	CL-ML, CL, GM-GC	A-4, A-6	0-5	60-90	55-80	45-75	45-70	25-40	5-20
	15-68	Gravelly clay, gravelly silty clay.	CH, CL, GC	A-7	0-5	50-90	40-75	40-70	40-70	45-70	20-40
SgF Sengtown	0-10	Gravelly silt loam.	ML, CL, CL-ML, GM	A-4	0-5	60-90	55-80	45-75	45-70	25-35	4-10
	10-16	Gravelly silt loam, gravelly silty clay loam.	CL-ML, CL, GM-GC	A-4, A-6	0-5	60-90	55-80	45-75	45-70	25-40	5-20
	16-60	Gravelly clay, gravelly silty clay.	CH, CL, GC	A-7	0-5	50-90	40-75	40-70	40-70	45-70	20-40

See footnote at end of table.

Table 14.--Engineering Index Properties--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
SrF*:											
Sengtown	0-10	Gravelly silt loam.	ML, CL, CL-ML, GM	A-4	0-5	60-90	55-80	45-75	45-70	25-35	4-10
	10-16	Gravelly silt loam, gravelly silty clay loam.	CL-ML, CL, GM-GC	A-4, A-6	0-5	60-90	55-80	45-75	45-70	25-40	5-20
	16-60	Gravelly clay, gravelly silty clay.	CH, CL, GC	A-7	0-5	50-90	40-75	40-70	40-70	45-70	20-40
Rock outcrop.											
Ta	0-9	Silt loam	CL-ML, ML	A-4	0	100	95-100	90-100	75-95	18-30	2-10
Taft	9-23	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6	0	100	95-100	95-100	85-95	23-38	5-16
	23-58	Silt loam, silty clay loam.	CL-ML, CL	A-4, A-6, A-7	0	95-100	90-100	85-100	80-95	23-42	5-20
	58-62	Silty clay loam, clay, cherty silty clay loam.	ML, GC, CL	A-6, A-7	0-20	65-100	55-100	45-90	36-85	35-48	12-22
TrB2, TrC2	0-8	Gravelly silt loam.	ML, CL, GM, SM	A-4	0-10	60-80	55-75	45-75	40-70	25-35	2-10
Tarklin	8-25	Gravelly silt loam, gravelly silty clay loam.	ML, CL, GM, GC	A-4, A-6, A-7-6	0-10	60-80	55-75	45-75	40-70	25-45	2-20
	25-60	Very gravelly silt loam, gravelly silty clay loam.	ML, CL, GM, GC	A-4, A-6, A-7-6, A-2	0-10	60-80	45-75	40-75	30-70	25-45	2-20
Ud*.											
Udorthents											
WfA, WfC	0-6	Silty clay loam	CL-ML, CL, ML	A-4, A-6	0	100	95-100	90-100	80-95	25-35	3-12
Wolftever	6-10	Silty clay, silty clay loam, silt loam.	ML, CL	A-4, A-6	0	100	95-100	90-100	80-95	30-40	7-15
	10-51	Silty clay, silty clay loam, clay.	ML, MH	A-7	0	100	95-100	90-100	75-95	41-55	11-20
	51-60	Loam, clay loam, silty clay loam.	CL-ML, CL	A-6, A-7, A-4	0	100	95-100	90-100	51-90	25-45	5-20

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 15.--Physical and Chemical Properties of the Soils

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
AmA	0-7	15-27	1.30-1.45	0.6-2.0	0.18-0.23	5.1-6.0	Low	0.43	5	1-3
Armour	7-60	22-35	1.30-1.50	0.6-2.0	0.17-0.20	5.1-6.0	Low	0.37		
AmB2, AmC2	0-4	15-27	1.30-1.45	0.6-2.0	0.18-0.23	5.1-6.0	Low	0.43	5	1-3
Armour	4-60	22-35	1.30-1.50	0.6-2.0	0.17-0.20	5.1-6.0	Low	0.37		
ArA, ArB	0-16	18-35	1.30-1.45	0.6-2.0	0.19-0.22	6.1-7.8	Low	0.37	5	2-4
Arrington	16-60	18-35	1.30-1.45	0.6-2.0	0.19-0.22	6.1-7.8	Low	0.37		
Be	0-6	22-35	1.35-1.55	0.6-2.0	0.17-0.20	4.5-6.0	Low	0.37	5	1-3
Beason	6-13	26-40	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.32		
	13-60	35-45	1.45-1.65	0.2-0.6	0.14-0.18	4.5-5.5	Low	0.32		
ByB2, ByC2	0-9	15-27	1.35-1.50	0.6-2.0	0.18-0.22	5.1-6.0	Low	0.43	3	1-3
Byler	9-24	20-35	1.35-1.50	0.6-2.0	0.17-0.20	5.1-6.0	Low	0.37		
	24-44	22-38	1.50-1.70	0.06-0.2	0.04-0.08	5.1-6.0	Low	0.32		
	44-60	40-55	1.30-1.50	0.2-0.6	0.04-0.08	5.1-6.0	Moderate	0.24		
DkB2	0-9	15-26	1.30-1.50	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.43	3	.5-2
Dickson	9-20	18-30	1.35-1.55	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.43		
	20-49	20-32	1.55-1.75	0.06-0.6	0.05-0.11	4.5-5.5	Low	0.43		
	49-60	35-50	1.35-1.55	0.2-0.6	0.02-0.04	4.5-5.5	Moderate	0.28		
En	0-7	12-25	1.30-1.45	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.28	5	1-3
Ennis	7-60	18-32	1.35-1.50	2.0-6.0	0.08-0.15	4.5-6.0	Low	0.28		
EwB2, EwC2	0-5	15-27	1.30-1.45	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.37	5	1-3
Etowah	5-34	23-35	1.35-1.50	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
	34-60	32-45	1.40-1.55	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.32		
Gu	0-17	10-25	1.35-1.55	0.6-2.0	0.20-0.22	3.6-5.5	Low	0.43	3	1-2
Guthrie	17-40	18-30	1.40-1.60	0.6-2.0	0.18-0.20	3.6-5.5	Low	0.43		
	40-52	18-32	1.60-1.75	0.06-0.2	0.03-0.05	3.6-5.5	Low	0.43		
	52-60	18-35	1.60-1.75	0.06-0.2	0.03-0.05	3.6-5.5	Low	0.43		
HaC, HaD	0-6	12-25	1.40-1.50	2.0-6.0	0.14-0.18	3.6-5.5	Low	0.20	2	1-3
Hawthorne	6-33	15-32	1.40-1.50	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.10		
	33-60	---	---	0.0-0.2	---	---		----		
HsF*:										
Hawthorne	0-6	12-25	1.40-1.50	2.0-6.0	0.14-0.18	3.6-5.5	Low	0.20	2	1-3
	6-33	15-32	1.40-1.50	2.0-6.0	0.05-0.10	3.6-5.5	Low	0.10		
	33-60	---	---	0.0-0.2	---	---		----		
Sulphura	0-10	15-25	1.30-1.50	0.6-2.0	0.12-0.17	5.1-6.0	Low	0.24	2	.5-2
	10-22	18-32	1.35-1.55	0.6-2.0	0.07-0.14	5.1-6.5	Low	0.24		
	22	---	---	0.00-0.06	---	---		----		
HuB, HuC	0-8	12-25	1.35-1.50	2.0-6.0	0.10-0.15	4.5-6.0	Low	0.28	5	2-4
Humphreys	8-51	18-32	1.35-1.55	2.0-6.0	0.09-0.14	4.5-6.0	Low	0.24		
	51-60	18-32	1.40-1.60	2.0-6.0	0.06-0.12	4.5-6.0	Low	0.24		
Ld	0-11	15-27	1.20-1.40	0.6-2.0	0.20-0.26	5.1-7.8	Low	0.32	5	2-4
Lindside	11-42	18-35	1.20-1.40	0.2-2.0	0.17-0.22	5.1-7.8	Low	0.37		
	42-60	18-35	1.20-1.40	0.2-6.0	0.12-0.18	5.6-7.8	Low	0.32		

See footnote at end of table.

Table 15.--Physical and Chemical Properties of the Soils--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
								K	T	
	In	Pct	g/cc	In/hr	In/in	pH				Pct
Me	0-10	12-17	1.20-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43	5	.5-3
Melvin	10-42	12-35	1.30-1.60	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43		
	42-60	7-40	1.40-1.70	0.6-2.0	0.16-0.23	5.6-7.8	Low	0.43		
MnC2, MnD2	0-8	15-30	1.30-1.45	2.0-6.0	0.14-0.18	4.5-5.5	Low	0.28	5	.5-2
Minvale	8-38	20-35	1.40-1.55	0.6-2.0	0.12-0.18	4.5-5.5	Low	0.28		
	38-60	25-45	1.40-1.55	0.6-2.0	0.11-0.17	4.5-5.5	Low	0.28		
MtB2, MtC2	0-6	15-25	1.35-1.55	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.43	5	1-3
Mountview	6-23	20-35	1.40-1.60	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.43		
	23-60	35-55	1.30-1.50	0.6-2.0	0.10-0.15	4.5-5.5	Moderate	0.32		
Ne	0-7	7-27	1.20-1.40	0.6-2.0	0.15-0.23	5.6-7.8	Low	0.43	5	1-4
Newark	7-26	18-35	1.20-1.45	0.6-2.0	0.18-0.23	5.6-7.8	Low	0.43		
	26-60	12-40	1.30-1.50	0.6-2.0	0.15-0.22	5.6-7.8	Low	0.43		
No	0-6	12-35	1.20-1.40	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43	5	2-4
Nolin	6-60	18-35	1.25-1.50	0.6-2.0	0.18-0.23	5.6-8.4	Low	0.43		
Pt*.										
Pits										
Rc*.										
Rock outcrop										
SgB2, SgC2, SgD2	0-5	12-27	1.35-1.55	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28	5	1-2
Sengtown	5-15	23-40	1.35-1.55	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24		
	15-68	40-60	1.35-1.60	0.6-2.0	0.08-0.12	4.5-6.0	Moderate	0.24		
SgF	0-10	12-27	1.35-1.55	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28	5	1-2
Sengtown	10-16	23-40	1.35-1.55	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24		
	16-60	40-60	1.35-1.60	0.6-2.0	0.08-0.12	4.5-6.0	Moderate	0.24		
SrF*:										
Sengtown	0-10	12-27	1.35-1.55	0.6-2.0	0.10-0.16	4.5-6.0	Low	0.28	5	1-2
	10-16	23-40	1.35-1.55	0.6-2.0	0.10-0.15	4.5-6.0	Low	0.24		
	16-60	40-60	1.35-1.60	0.6-2.0	0.08-0.12	4.5-6.0	Moderate	0.24		
Rock outcrop.										
Ta	0-9	10-25	1.30-1.40	0.6-2.0	0.20-0.22	4.5-5.5	Low	0.43	3	2-5
Taft	9-23	18-35	1.30-1.50	0.6-2.0	0.18-0.20	4.5-5.5	Low	0.43		
	23-58	15-35	1.50-1.65	0.06-0.2	0.03-0.07	4.5-5.5	Low	0.43		
	58-62	8-45	1.35-1.60	0.2-0.6	0.01-0.03	4.5-5.5	Low	0.37		
TrB2, TrC2	0-8	18-25	1.25-1.45	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28	3	.5-2
Tarklin	8-25	20-34	1.45-1.55	0.6-6.0	0.13-0.18	3.6-5.5	Low	0.28		
	25-60	20-34	1.45-1.60	0.06-0.2	0.06-0.10	3.6-5.5	Low	0.28		
Ud*.										
Udorthents										
WfA, WfC	0-6	22-40	1.35-1.45	0.6-2.0	0.17-0.20	4.5-5.5	Low	0.37	5	1-3
Wolftever	6-10	22-45	1.35-1.50	0.2-0.6	0.15-0.18	4.5-5.5	Low	0.32		
	10-51	35-55	1.40-1.60	0.2-0.6	0.13-0.17	4.5-5.5	Moderate	0.32		
	51-60	20-40	1.40-1.60	0.2-0.6	0.13-0.17	4.5-5.5	Low	0.32		

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 16.--Soil and Water Features

("Flooding" and "water table" and terms such as "frequent," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
AmA, AmB2, AmC2---Armour	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
ArA, ArB---Arrington	B	Occasional	Very brief	Dec-Apr	4.0-6.0	Apparent	Jan-Mar	>60	---	Low	Low.
Be---Beason	C	Occasional	Very brief	Dec-Apr	1.0-2.0	Apparent	Dec-Apr	>60	---	High	High.
ByB2, ByC2---Byler	C	None	---	---	2.0-3.0	Perched	Dec-Mar	>60	---	High	Moderate.
DkB2---Dickson	C	None	---	---	2.0-3.0	Perched	Jan-Apr	>60	---	Moderate	Moderate.
En---Ennis	B	Occasional	Very brief	Dec-Mar	>6.0	---	---	>60	---	Low	Moderate.
EwB2, EwC2---Etowah	B	None	---	---	>6.0	---	---	>60	---	Low	Moderate.
Gu---Guthrie	D	Occasional	Brief	Jan-Apr	0.5-1.0	Perched	Jan-Apr	>60	---	High	High.
HaC, HaD---Hawthorne	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
HsF*:											
Hawthorne----	B	None	---	---	>6.0	---	---	20-40	Soft	Low	High.
Sulphura----	D	None	---	---	>6.0	---	---	20-40	Hard	Low	Moderate.
HuB, HuC---Humphreys	B	None	---	---	5.0-6.0	Apparent	Dec-Mar	>60	---	Moderate	Moderate.
Ld---Lindside	C	Occasional	Very brief	Jan-Apr	1.5-3.0	Apparent	Dec-Apr	>60	---	Moderate	Low.
Me---Melvin	D	Frequent	Long	Dec-May	0-1.0	Apparent	Dec-May	>60	---	High	Low.
MnC2, MnD2---Minvale	B	None	---	---	>6.0	---	---	>60	---	Moderate	Low.
MtB2, MtC2---Mountview	B	None	---	---	>6.0	---	---	>60	---	Moderate	Moderate.
Ne---Newark	C	Frequent	Long	Jan-Apr	0.5-1.5	Apparent	Dec-May	>60	---	High	Low.
No---Nolin	B	Occasional	Brief	Jan-Apr	3.0-6.0	Apparent	Feb-Mar	>60	---	Low	Moderate.
Pt*. Pits											

See footnote at end of table.

Table 16.--Soil and Water Features--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	Uncoated steel	Concrete
					Ft			In			
Rc*. Rock outcrop											
SgB2, SgC2, SgD2, SgF Sengtown	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
SrF*: Sengtown	B	None	---	---	>6.0	---	---	>60	---	High	Moderate.
Rock outcrop.											
Ta Taft	C	None	---	---	1.0-2.0	Perched	Jan-Apr	>60	---	High	High.
TrB2, TrC2 Tarklin	C	None	---	---	1.5-2.0	Perched	Jan-Apr	>60	---	Moderate	High.
Ud*. Udorthents											
WfA, WfC Wolftever	C	Occasional	Very brief	Dec-Apr	2.5-3.5	Apparent	Dec-Mar	>60	---	High	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

Table 17.--Classification of the Soils

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Armour	Fine-silty, mixed, thermic Ultic Hapludalfs
Arrington	Fine-silty, mixed, thermic Cumulic Hapludolls
*Beason	Clayey, mixed, thermic Aquic Hapludults
Byler	Fine-silty, siliceous, thermic Typic Fragiudalfs
Dickson	Fine-silty, siliceous, thermic Glossic Fragiudults
Ennis	Fine-loamy, siliceous, thermic Fluventic Dystrochrepts
Etowah	Fine-loamy, siliceous, thermic Typic Paleudults
Guthrie	Fine-silty, siliceous, thermic Typic Fragiaquults
Hawthorne	Loamy-skeletal, siliceous, thermic Ruptic-Ultic Dystrochrepts
Humphreys	Fine-loamy, siliceous, thermic Humic Hapludults
Lindside	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Melvin	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Minvale	Fine-loamy, siliceous, thermic Typic Paleudults
Mountview	Fine-silty, siliceous, thermic Typic Paleudults
Newark	Fine-silty, mixed, nonacid, mesic Aeric Fluvaquents
Nolin	Fine-silty, mixed, mesic Dystric Fluventic Eutrochrepts
Sengtown	Fine, mixed, thermic Typic Paleudalfs
Sulphura	Loamy-skeletal, siliceous, thermic Ruptic-Alfic Dystrochrepts
Taft	Fine-silty, siliceous, thermic Glossaquic Fragiudults
Tarklin	Fine-loamy, siliceous, mesic Typic Fragiudults
*Wolftever	Clayey, mixed, thermic Aquic Hapludults